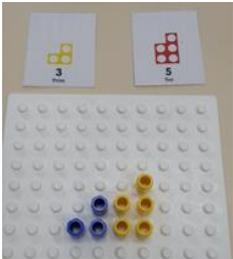
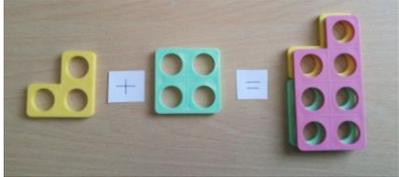
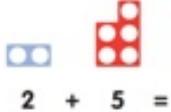
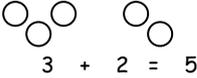
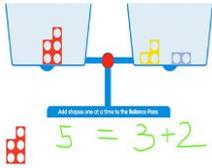
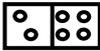
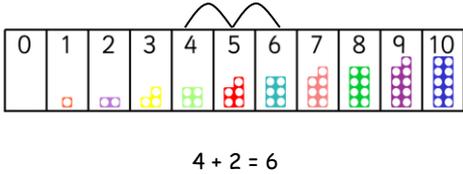


ADDITION STRATEGIES

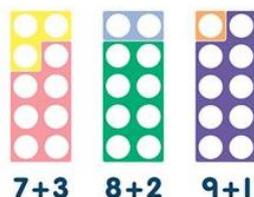
	Strategy	Key concepts
<p>Foundation Stage</p> <p><i>Aim by end of year:</i> - All can say which number is one more or one less than a given number - Using quantities and objects, all can add and subtract two single-digit numbers and count on or back to find the answer - All can move (count on or back) up to 10 spaces on a number track.</p>	<p>Addition must be introduced and taught through stories and practical problems in a real or role play context throughout Foundation Stage to give meaning to the concept.</p>	
	<p>Numicon pegs are introduced straight away through structured and self-initiated activities to allow the pupils to become familiar with them. In preparation for calculations, pupils should be able to recognise, name and order the shapes and be able to use the shape patterns to organise groups of objects.</p>	<p>See EYFS Numicon EOY outcomes for further support and ideas.</p>
	<p>Begin to explore addition first through the use of concrete objects, including Numicon pegs, and pictures.</p> <div style="display: flex; justify-content: space-around;">   </div> <p>When ready, pupils will move to addition using the Numicon shapes.</p> <div style="text-align: center;">  </div>	<p>Pupils should begin to organise the objects / pegs in the Numicon shape patterns when ready to help them calculate without counting.</p> <p>Pupils should be taught to create Numicon patterns 2 handed, from the bottom up (ie. One object in each hand simultaneously).</p> <p>When combining Numicon shapes for addition, pupils must be taught to put the shapes 'together', manipulating them as needed to make them fit, and placing the correct piece on top to confirm the total.</p>
<p>Pupils will begin to read and respond to pictorial number sentences.</p> <div style="display: flex; justify-content: space-around; align-items: center;">   </div>	<p>Numicon shapes and flashcards Numicon dice and spinners</p>	
<p>Begin to record numbers and number sentences, when ready.</p> <div style="display: flex; justify-content: space-around; align-items: center;">   </div> <p>Select two groups of objects to make a given total e.g. Find dominoes with 6 dots on. Adults scribe number sentences.</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  $2 + 4 = 6$ </div> <div style="text-align: center;">  $1 + 5 = 6$ </div> </div>	<p>Children should learn to sing lots of number rhyme songs eg. 1 potato, 1,2 Buckle my shoe. Subtraction songs can also be adapted to fit subtraction</p> <p>Key resources: Practical counting equipment Horizontal and vertical number tracks / lines Washing line Cubes Rulers Board games Dominoes</p>	

ADDITION STRATEGIES

	<p>Adults model use of number tracks and number lines to support understanding of addition and finding one more than. Number tracks / lines should not be used as the only method for addition at this stage.</p>  <p style="text-align: center;">$4 + 2 = 6$</p>	<p>Numicon shapes, dice, spinners, IWB software</p> <p>Use a number track to find one more than a number. Say the number one more than when playing a board game. Experience addition as counting on. Children to work practically with bead bars and bead strings. Number tracks and number lines to be available for children to use in free flow activities.</p>
	<p>Explore own ways of recording for addition. Using pictures, symbols, apparatus e.g.</p>  <p style="text-align: center;">$3 + 2 \rightarrow 5$</p>	
	<p>Pupils should begin to explore making and partitioning teens numbers using the Numicon apparatus to begin to build understanding of the structure of 2 digit numbers.</p> 	
<p>Year 1</p> <p><i>Aim by end of year:</i></p> <ul style="list-style-type: none"> ▪ <i>represent and use number bonds and related subtraction facts within 20</i> ▪ <i>add and subtract one-digit and two-digit numbers to 20, including zero</i> ▪ <i>solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems</i> 	<p>Pupils build on knowledge gained in EYFS by using Numicon as the primary resource for addition, supported by number lines. As pupils become more fluent in the use of Numicon, they become more able use it to calculate without counting.</p> <p>Addition by putting the Numicon 'together'</p>  <p>Moving to beginning to combine horizontally</p>  <p>Reinforcing number bonds and related subtraction facts to 10</p>	<p>Numicon shapes, flashcards, dice, spinners, IWB software.</p>

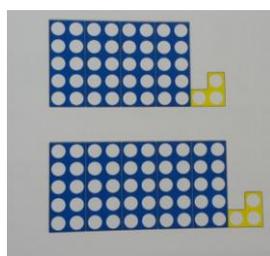
ADDITION STRATEGIES

and 20 using the Numicon apparatus.

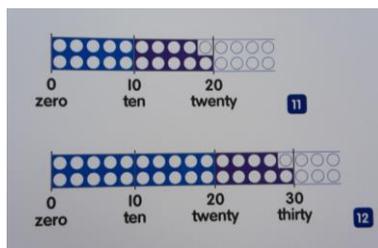


Pupils develop their addition supported by Numicon by beginning to combine Numicon shapes horizontally along a tens number line, enabling further scope for adding larger numbers.

Moving from...

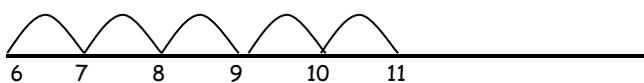


To ...



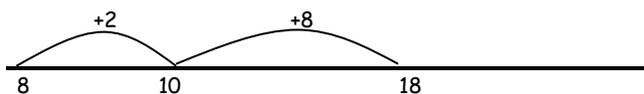
Leading to pupils record addition by showing jumps on prepared number lines

e.g. $6 + 5 = 11$



Begin to record addition by choosing own jumps on a number line, bridging through 10

e.g. $8 + 10 = 18$



Only when ready, pupils may begin to use a 100 square to add 10 and multiples of 10 to a number, moving across and down the square as needed. Given that this does not support the

Children should be exposed to both horizontal and vertical addition calculations although they are not expected to record vertically until Year 3.

Number bond knowledge is key for addition and should be revisited regularly in mental oral starters.

Key resources:

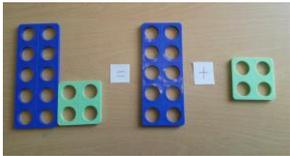
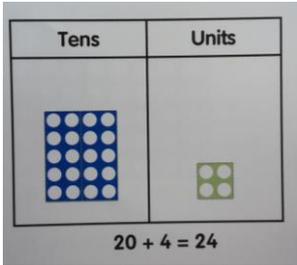
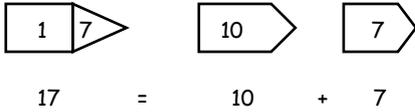
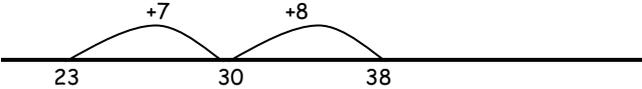
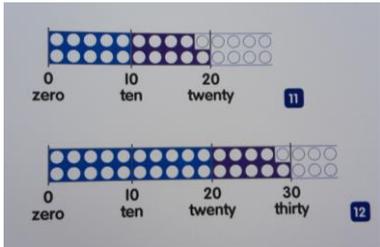
- Practical counting equipment
- Horizontal and vertical number tracks / lines
- Washing line
- Rulers
- Cubes
- Counting sticks
- Hundred squares
- Carpet tiles
- Numicon shapes
- Numicon 10s number line

Children should be taught to always start counting on from larger number for addition then count on using number line, fingers, cubes etc.

During mental oral starters, use number line and 100 square as appropriate to:

- to add 10 to a single digit number
- to add single digit numbers that bridge through 10

ADDITION STRATEGIES

	<p>understanding of the concept, this should only be modelled when pupils are confident in the concepts of addition and a number square.</p>	<p>Encourage children to build confidence in moving across a 100 square by playing games with it. Eg. Roll die marked +1, -1, +10, -10 and move from given squares. This can later be adjusted to numbers such as 9, 11, 19 etc. (Use blank die from Maths resource room)</p>
	<p>Begin to partition numbers using Numicon shapes, and later place value cards, in preparation for later methods.</p>   $20 + 4 = 24$  <p>17 = 10 + 7</p>	<p>Key resources: Numicon shapes Place value cards / numbers up cards Base 10 blocks</p>
<p>Year 2</p> <p><i>Aim by end of year:</i> <i>Solve problems with addition and subtraction:</i></p> <ul style="list-style-type: none"> - using concrete objects and pictorial representations, including those involving numbers, quantities and measures - applying their increasing knowledge of mental and written methods <p>▪ recall and use addition and subtraction</p>	<p>Pupils build on prior knowledge by using Numicon as the primary resource for addition alongside number lines.</p> <p>Use prepared number lines, then progress on to drawing own empty number lines to support addition</p>  <p>Combining Numicon horizontally along the Numicon tens line, supports this working and gives a visual image to support learning.</p> 	<p>Use hundred squares and prepared and own number lines (as appropriate) to:</p> <ul style="list-style-type: none"> - count in tens eg. 23 + 20 - count in multiples of ten <p>Encourage children to build confidence in moving across a 100 square by playing games with it. Eg. Roll die marked +1, -1, +10, -10 and move from given squares. This can later be adjusted to numbers such as 9, 11, 19 etc.</p> <p>Key resources: Practical counting equipment Horizontal and vertical number lines Washing line Cubes Hundred squares Carpet tiles</p>

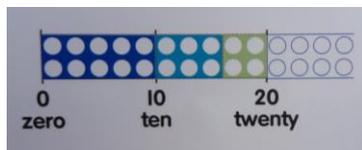
ADDITION STRATEGIES

facts to 20 fluently, and derive and use related facts up to 100

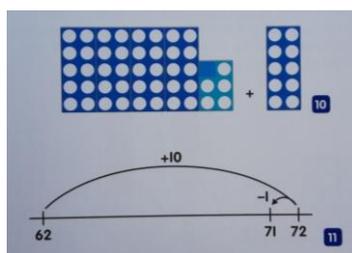
▪ *add and subtract numbers using concrete objects, pictorial representations, and mentally, including:*

- *a two-digit number and ones*
- *a two-digit number and tens*
- *two two-digit numbers*
- *adding three one-digit numbers*

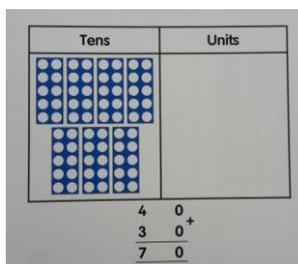
Further strategies should be modelled and taught through Numicon, including adding to the next multiple of 10...



And adding 9, by adding 10 and adjusting...

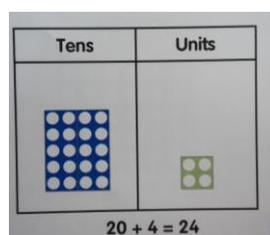


Pupils can also begin to record vertically, using the Tens and Units frame (in Numicon 2 folder, Photocopy Masters) to support.



When pupils have sound understanding of the concept of addition and place value, they can be moved on to using 100 squares to support mental addition.

Continue to rehearse partitioning 2 digit numbers, using Numicon, digit cards and Base 10 to support.



Add two 2 digit numbers by partitioning both numbers and recording informally.

Digit cards, Numicon and Base 10 should be used to support understanding (as in Year 1).

Numicon shapes

Numicon tens number lines

Numicon IWB software

Numicon 2 Folder Photocopy Masters

Informal recording may include jottings, drawings or markings on a number line.

Children should be exposed to both horizontal and vertical addition calculations although they are not expected to record vertically until Year 4.

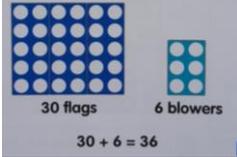
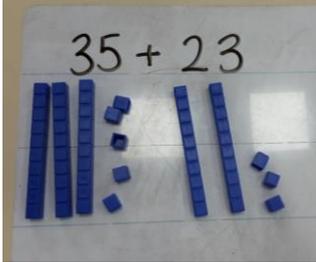
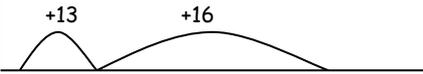
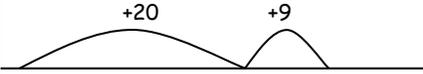
Key resources:

Place value cards / numbers up cards

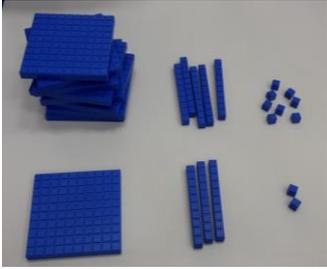
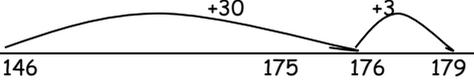
Base 10 blocks

Numicon shapes

ADDITION STRATEGIES

	<div style="text-align: center;"> $\begin{array}{c} 35 + 23 \\ \swarrow \quad \searrow \quad \swarrow \quad \searrow \\ 30 \quad 5 \quad 20 \quad 3 \end{array}$ </div> <p> $35 + 23$ $30 + 20 = 50$ $5 + 3 = 8$ $50 + 8 = 58$ </p> <p>Lead to partitioning second number only.</p> <p> $35 + 20 + 3$ $55 + 3 = 58$ </p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  <p>10 flags 26 blowers</p> <p>$10 + 26 = 36$</p> </div> <div style="text-align: center;">  <p>30 flags 6 blowers</p> <p>$30 + 6 = 36$</p> </div> <div style="text-align: center;">  <p>$35 + 23$</p> </div> </div> <p>Base 10 may become a useful alternative to allow for space for pupils to work individually with larger numbers.</p>	
<p>Year 3</p> <p><u><i>Aim by end of year:</i></u> <i>Add and subtract numbers mentally, including:</i></p> <ul style="list-style-type: none"> - a three-digit number and ones - a three-digit number and tens - a three-digit number and hundreds <p><i>Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction</i></p>	<p>Develop methods for adding two digit and three digit numbers by drawing own number line and choosing appropriate jumps. As in Year 2, Numicon may be used to support addition of 2 TU numbers where appropriate.</p> <p>$187 + 29$</p> <p>Eg.</p> <div style="text-align: center;">  <p>187 200 216</p> </div> <div style="text-align: center;">  <p>187 207 216</p> </div> <p>Develop methods for adding two digit and three digit numbers by partitioning second number only. Digit cards and Base 10 should be used to support understanding (as in Year 2).</p> <p> $246 + 87$ $246 + 80 + 7$ or $246 + 7 + 80$ </p>	<p>Pupils should be exposed to different ways of moving along a number line, eg. Bridging through 10 / 100 or jumping in tens then units.</p> <p>Oral counting in multiples of 10 from any given number should be rehearsed during mental oral starters to support addition.</p> <p>Key resources: Practical counting equipment Cubes Prepared and blank number lines Hundred squares Carpet tiles Bead strings Numicon Base 10</p> <p>Key resources: Place value cards Place value counters Base 10 blocks</p>

ADDITION STRATEGIES

	$356 + 427 = 356 + (400 + 20 + 7)$ First step: leading to: $356 + 400 = 756$ $= 756 + 20 + 7$ $756 + 20 = 776$ $= 776 + 7$ $776 + 7 = 783$ $= 783$ Addition by partitioning using Base 10							
	Use knowledge of place value and partitioning of three digit numbers to develop written methods for addition of two and three digit numbers using expanded method of recording. $375 + 67$ $\begin{array}{r} 300 \quad 70 \quad 5 \\ + \quad \quad 60 \quad 7 \\ \hline 300 \quad 130 \quad 12 \end{array} = 442$ Base 10 should be used alongside this step to give a visual image to support understanding.  $\begin{array}{r} 300 \quad 70 \quad 5 \\ + \quad \quad 60 \quad 7 \\ \hline 300 \quad 130 \quad 12 \end{array} = 442$	Add least significant digits first. Children should be encouraged to use squares on paper and record jottings neatly to support place value and later written methods. Key resources: Place value cards Base 10 blocks Grid whiteboards Place value counters						
	Use column method for addition. Use numbers with both digits below 5 initially, moving on to 'carrying' below the line. <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; padding-right: 20px;">To tens</th> <th style="text-align: left; padding-right: 20px;">to hundreds</th> <th style="text-align: left;">tens and hundreds</th> </tr> </thead> <tbody> <tr> <td style="padding-right: 20px;">$\begin{array}{r} 6 \ 2 \ 5 \\ + \ 4 \ 8 \\ \hline 6 \ 7 \ 3 \\ \pm \end{array}$</td> <td style="padding-right: 20px;">$\begin{array}{r} 7 \ 8 \ 3 \\ + \ 4 \ 2 \\ \hline 8 \ 2 \ 5 \\ \pm \end{array}$</td> <td>$\begin{array}{r} 3 \ 6 \ 7 \\ + \ 8 \ 5 \\ \hline 4 \ 5 \ 2 \\ \pm \pm \end{array}$</td> </tr> </tbody> </table>	To tens	to hundreds	tens and hundreds	$\begin{array}{r} 6 \ 2 \ 5 \\ + \ 4 \ 8 \\ \hline 6 \ 7 \ 3 \\ \pm \end{array}$	$\begin{array}{r} 7 \ 8 \ 3 \\ + \ 4 \ 2 \\ \hline 8 \ 2 \ 5 \\ \pm \end{array}$	$\begin{array}{r} 3 \ 6 \ 7 \\ + \ 8 \ 5 \\ \hline 4 \ 5 \ 2 \\ \pm \pm \end{array}$	When carrying, encourage pupils to cross out the digit that has been carried, once it has been added in. Key resources: Place value cards Base 10 blocks Grid whiteboards Place value counters
To tens	to hundreds	tens and hundreds						
$\begin{array}{r} 6 \ 2 \ 5 \\ + \ 4 \ 8 \\ \hline 6 \ 7 \ 3 \\ \pm \end{array}$	$\begin{array}{r} 7 \ 8 \ 3 \\ + \ 4 \ 2 \\ \hline 8 \ 2 \ 5 \\ \pm \end{array}$	$\begin{array}{r} 3 \ 6 \ 7 \\ + \ 8 \ 5 \\ \hline 4 \ 5 \ 2 \\ \pm \pm \end{array}$						
Year 4 <u>Aim by end of year:</u> <ul style="list-style-type: none"> ▪ <i>add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate</i> 	Develop use of empty number lines, partitioning and other informal recording methods developed in Y1,2 and 3 to support and explain calculations where appropriate e.g. <ul style="list-style-type: none"> • $146 + 33$  • $548 + 235$ $548 + 235 = 548 + 200 + 30 + 5$ $= 748 + 30 + 5$ $= 778 + 5$ $= 783$ 	Oral counting in multiples of 10 and 100 from any given number should be rehearsed during mental oral starters to support addition. Key resources: Laminated blank number lines Place value cards / numbers up cards Hundred squares						

ADDITION STRATEGIES

	<p>Use column method for addition. Use numbers with both digits below 5 initially, moving on to 'carrying' below the line.</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center; padding: 5px;">To tens $\begin{array}{r} 625 \\ + 48 \\ \hline 673 \\ \pm \end{array}$</td> <td style="text-align: center; padding: 5px;">to hundreds $\begin{array}{r} 783 \\ + 42 \\ \hline 825 \\ \pm \end{array}$</td> <td style="text-align: center; padding: 5px;">tens and hundreds $\begin{array}{r} 367 \\ + 85 \\ \hline 452 \\ \pm \end{array}$</td> </tr> </table> <p>Extend to decimals as appropriate e.g. money knowing that the decimal points should line up under each other.</p>	To tens $\begin{array}{r} 625 \\ + 48 \\ \hline 673 \\ \pm \end{array}$	to hundreds $\begin{array}{r} 783 \\ + 42 \\ \hline 825 \\ \pm \end{array}$	tens and hundreds $\begin{array}{r} 367 \\ + 85 \\ \hline 452 \\ \pm \end{array}$	<p>When carrying, encourage pupils to cross out the digit that has been carried, once it has been added in.</p> <p>Key resources: Place value cards Base 10 blocks Grid whiteboards Place value counters</p>
To tens $\begin{array}{r} 625 \\ + 48 \\ \hline 673 \\ \pm \end{array}$	to hundreds $\begin{array}{r} 783 \\ + 42 \\ \hline 825 \\ \pm \end{array}$	tens and hundreds $\begin{array}{r} 367 \\ + 85 \\ \hline 452 \\ \pm \end{array}$			
<p>Year 5</p> <p><i>Aim by end of year:</i></p> <ul style="list-style-type: none"> ▪ <i>add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction)</i> 	<p>Develop use of empty number lines, partitioning and other informal recording methods to support and explain calculations where appropriate (including decimals and time).</p> <div style="text-align: center; margin: 10px 0;"> </div> <p>Use compact ('carrying') method.</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center; padding: 5px;">$\begin{array}{r} 587 \\ + 475 \\ \hline 1062 \\ 11 \end{array}$</td> <td style="text-align: center; padding: 5px;">$\begin{array}{r} 3587 \\ + 675 \\ \hline 4262 \\ 111 \end{array}$</td> </tr> </table>	$\begin{array}{r} 587 \\ + 475 \\ \hline 1062 \\ 11 \end{array}$	$\begin{array}{r} 3587 \\ + 675 \\ \hline 4262 \\ 111 \end{array}$	<p>Key resources: Laminated blank number lines Place value cards / numbers up cards</p> <p>Children may need to return to expanded method when first carrying out addition of decimals - least significant digits first.</p> <p>Ensure that children know the importance of 'lining up' the decimal points particularly when adding mixed amounts e.g. 16.4 m. + 7.68 m.</p> <div style="text-align: center; margin: 10px 0;"> $\begin{array}{r} 16.4 \\ + 7.68 \\ \hline 24.08m. \\ 11 \end{array}$ </div> <p>Key resources: Place value cards Base 10 blocks Grid whiteboards Place value counters</p>	
$\begin{array}{r} 587 \\ + 475 \\ \hline 1062 \\ 11 \end{array}$	$\begin{array}{r} 3587 \\ + 675 \\ \hline 4262 \\ 111 \end{array}$				
<p>Year 6</p> <p><i>Aim by the end of Year 6:</i></p> <ul style="list-style-type: none"> ▪ <i>add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction) (as Year 5)</i> 	<p>Develop use of empty number lines, partitioning and other informal recording methods developed in earlier years to support and explain calculations where appropriate (including decimals).</p> <p>Children should also be taught to use number lines when calculating periods of time.</p> <div style="text-align: center; margin: 10px 0;"> </div> <p>Use compact ('carrying') method. As Y5, extend method to any number of digits and decimal places</p> <div style="text-align: center; margin: 10px 0;"> 13.563 </div>	<p>Key resources: Place value cards</p>			

ADDITION STRATEGIES

	$\begin{array}{r} + 11.619 \\ 25.182 \\ \hline \end{array}$ <p>For those children who have not mastered compact method or are unable to use it reliably, use expanded method, but teach again when appropriate.</p> $375 + 67$ $\begin{array}{r} 300 \quad 70 \quad 5 \\ + \quad 60 \quad 7 \\ \hline 300 \quad 130 \quad 12 = 442 \end{array}$	Base 10 blocks Grid whiteboards Place value counters
--	---	--