



## Developing a whole school approach: counting, place value and addition

Bosley St Mary's Primary School





### Aims

- To consider the development of skills and processes associated with counting, place value and addition
- To consider teaching approaches and practical resources to support these and to address misconceptions either whole class or through interventions
- To reflect on your own practice and to identify personal next steps to investigate within your own class teaching





### Curriculum aims

A numerate child:





### Counting

- Take a handful of objects and find out how many you have
- Talk to the person next to you about how you found your total. How did they find their total?
- What was the same and different about your approaches?
- Was anything particularly difficult? Was anything particularly easy?
- Was there anything that you did automatically, almost without having to think?





### Principles of counting and possible misconceptions




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Not understanding the cardinal number



Five



Understanding the cardinal number



Five

The lower diagram also illustrates 'structural inclusion' - the idea that number is progressive and bigger numbers contain all the smaller numbers before them

- Estimation


### Money

- How much altogether?



- What do I need to make 5p?





### What skills are you using?

- Write these numbers in order of size starting with the smallest

901 1091 910 109 190

□ □ □ □ □

smallest



### What skills are you using?

3 8 9 1

- Choose three of these number cards to make an even number that is greater than 400

□ □ □



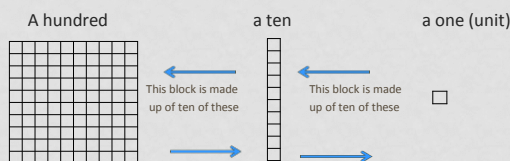
### The different elements of place value

Here are some of the skills associated with place value:

- Comparing/ordering
  - Reading and writing numerals
  - Partitioning/recombining
  - Positioning numbers on a number track or number line
  - Estimating and rounding
- Discuss with the person next to you how much place value related work you have delivered this week? What resources have you used? Are there any other skills to add to the list?



### Explaining place value



- What other resources (concrete objects) do you use?



### Representing numbers

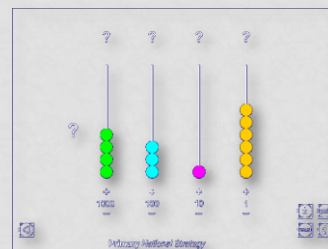
- Using the base-ten blocks, place value counters, arrow cards, straws and money represent the following numerals:

- 200
- 207
- 245
- 266

hundreds	tens	ones
100	10	1
100	10	1
	10	1
	10	1
	10	1



### Beadstick



### Prerequisite skills for all calculations

- Counting, estimation and place value:
- Knowing the number names in order
  - Sequencing and ordering numerals (consecutive and random)
  - Recognising that the number associated with the last object touched is the total number of objects (cardinal)
  - Recognising small numbers of objects without counting them (subitising)
  - Recognising that if a group of objects already counted is rearranged, the total number stays the same (conservation)
  - Making a reasonable estimate of a number without counting
  - Recognising that if objects are added or removed, the number of objects changes
  - Having a full understanding of the quantity represented by the numerals with which they are calculating



### Teaching children to calculate mentally

- The four chapters of the booklet cover:
1. **Progression** in mental calculation skills
  2. **Principles** of teaching mental calculation
  3. **Addition** and **subtraction** strategies
  4. **Multiplication** and **division** strategies

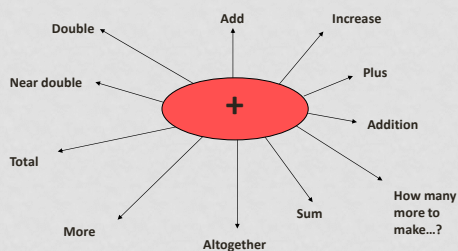


### Addition

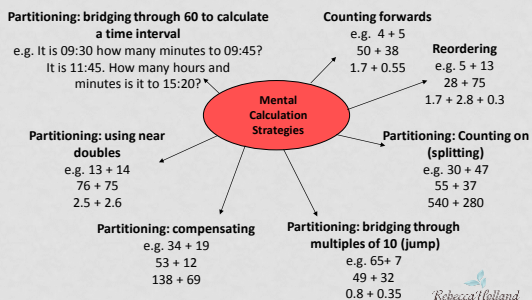
	$8 + 3 + 5 + 2$	
$25 + 14$		$5.7 + 3.9$
$25 + 36 + 75$		$5.6 + 3.7$
	$34 + 19$	



### Addition



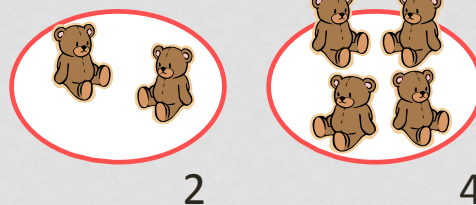
### Range of mental calculation strategies



### Combining two sets of objects (aggregation)

Pictures and words

Symbols



### Counting-on (augmentation)

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### Supporting children to structure numbers to 10

- Making finger patterns for numbers in the range 1 to 5
- Making finger patterns for numbers in the range 6 to 10
- Naming and visualising domino patterns 1 to 6
- Naming and visualising pair-wise patterns on a ten frame
- Naming and visualising five-wise patterns on a ten frame
- Partitions of 5 and 10
- Addition and subtraction in the range of 1 to 10

Wright, Robert J, Stanger, Garry, Stafford, Ann K and Martland, James (2006) *Teaching Number in the Classroom with 4-8 year-olds* Sage publications

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### Using a number line (augmentation)

7 + 5 =  
7 + 3 + 2 =

Bridging through ten

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### Moving towards a written method – Representing quantity

23 + 16

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### Modelling with arrow cards

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### Place value counters

47 + 35

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### Moving to a written method

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### Expanded format – Compact method

$$\begin{array}{r}
 647 \\
 + 326 \\
 \hline
 13 \\
 60 \\
 \hline
 900 \\
 \hline
 973
 \end{array}
 \quad \rightarrow \quad
 \begin{array}{r}
 647 \\
 + 326 \\
 \hline
 973 \\
 \hline
 1
 \end{array}$$

least significant digit first

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### Using a number line in the context of time

The time is 10:36. How long will it be to 11:15?

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### Addition of decimal numbers

11.6 + 4.51

tens	ones	tenths	hundredths

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### Next steps

- For you:
  - What approaches, resources or models and images will you build into your lessons?
  - .
- For your school:
  - Do you need to make any changes to your documented approach?
  - .
- For 22<sup>nd</sup> January:
  - Bring examples of approaches to subtraction to share at the meeting

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