## ADDITION CALCULATION GUIDANCE

**Year 1**

Pupils should be taught to:

- read, write and interpret mathematical statements involving addition …equals (=) signs
- represent and use number … within 20
- add … one-digit and two-digit numbers to 20, including zero
- solve one-step problems that involve addition …, using concrete objects and pictorial representations, and missing number problems.

**Year 2**

Pupils should be taught to:
Solve problems with addition…:

- using concrete objects and pictorial representations, including those involving numbers, quantities and measures
- applying their increasing knowledge of mental and written methods
- recall and use addition … facts to 20 fluently, and derive and use related facts up to 100
- add … 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
- show that addition of two numbers can be done in any order (commutative)
- recognise and use the inverse relationship between addition and subtraction and use this to check calculations and missing number problems.

**Year 3**

Pupils should be taught to:

- add … numbers mentally, including:
- a three-digit number and ones
- a three-digit number and tens
- a three-digit number and hundreds
- add … numbers with up to three digits, using formal written methods of columnar addition
- estimate the answer to a calculation and use inverse operations to check answers
- solve problems, including missing number problems, using number facts, place value, and more complex addition.

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**Year 4**

Pupils should be taught to:

- add … numbers with up to 4 digits using the formal written methods of columnar addition … where appropriate
- estimate and use inverse operations to check answers to a calculation
- solve addition… two-step problems in contexts, deciding which operations and methods to use and why.

**Year 5**

Pupils should be taught to:

- add … whole numbers with more than 4 digits, including using formal written methods (columnar addition)
- add … numbers mentally with increasingly large numbers
- use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy
- solve addition… multi-step problems in contexts, deciding which operations and methods to use and why.

**Year 6**

Pupils should be taught to:

- perform mental calculations, including with mixed operations and large numbers.
- use their knowledge of the order of operations to carry out calculations involving the four operations
- solve addition… multi-step problems in contexts, deciding which operations and methods to use and why
- solve problems involving addition
- use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy.

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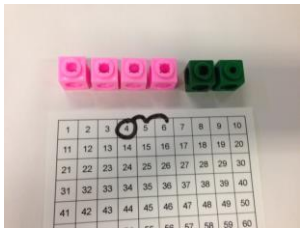
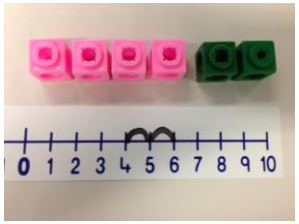
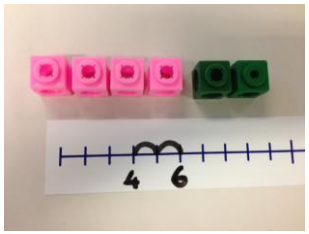
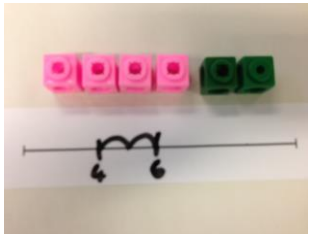
STAGE 1

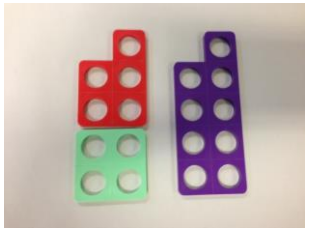
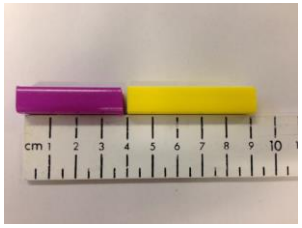
Count on using number tracks / number lines / 100 grids to support.



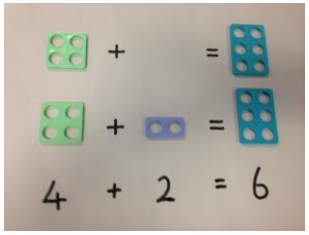



Develop concept of number bonds, initially to ten and then to 20.
Record related number facts.
e.g. 4 +5 = 9, 5 + 4 = 9, 9 = 4 + 5, 9 = 5 + 4

STAGE 2

Develop understanding of the equals sign / equality and the concept of 'empty box' questions.
Record solutions to calculations such as 4 + ☐ = 9.

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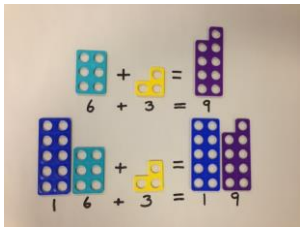
Use understanding of patterning, place value and partitioning to derive number facts.
e.g. 6 + 3 = 9 (known fact)
16 + 3 = 19
26 + 3 = 29

Begin to use understanding of place value and partitioning to carry out addition of one- digit and two-digit numbers.

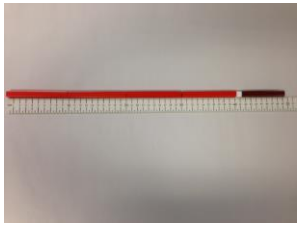


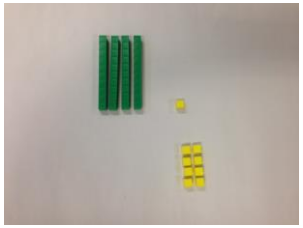

STAGE 3

TU + U
Continue to develop understanding of partitioning and place value and use this to support addition.

41+ 8
40 + 1 + 8
40 + 9= 49

Practical apparatus is used to support this, as are number tracks /100 squares and number lines.
Record the outcomes of calculations in horizontal format.





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When confident with concepts of partitioning and place value, horizontal recording can be replaced with recording in columns with a focus on place value.

| | T | U |
|---|---|---|
| | 4 | 1 |
| + | | 8 |
| | 4 | 9 |

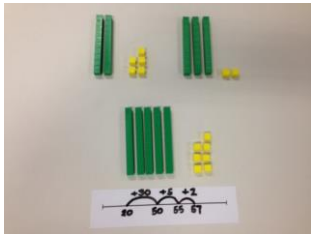
STAGE 4

TU + TU
Continue to develop understanding of partitioning and place value and use this to support addition.

25 + 32
20 + 30 = 50
5 + 2 = 7
50 + 7 = 57

Practical apparatus is used to support this, as are number tracks /100 squares and number lines.
Record the outcomes of calculations in horizontal format.

Where units combine to make totals greater than 10, regroup using partitioning skills
25 + 36
20 + 30 = 50
5 + 6 = 11
50 + 11 = 50 + 10 + 1= 61




Pupils continue to determine when calculations are best carried out using mental strategies.
Horizontal recording can begin to be replaced with recording in columns with a focus on place value. Use expanded recording and apparatus to illustrate concept initially if required before moving towards the formal written method.

| | T | U |
|---|---|---|
| | 2 | 5 |
| + | 3 | 6 |
| | 6 | 1 |

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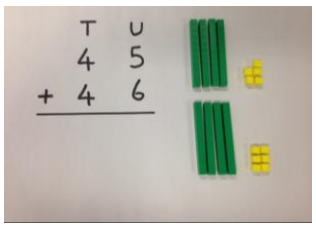
STAGE 5

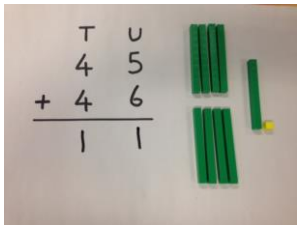
Continue to determine when calculations are best carried out using mental strategies.

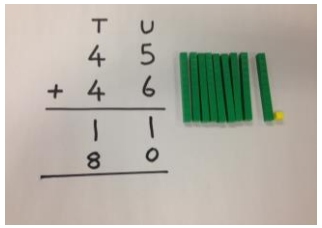
When written methods are more appropriate, continue use of practical apparatus to support, develop an understanding of the formal written method for column addition, initially without and then introducing carrying.

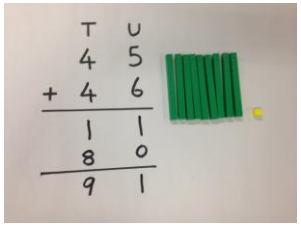
Initially use expanded recording if appropriate to explore concept.

```
  T  U
  4  5
+ 4  6
  1  1
  8  0
  9  1
```










becomes

```
  T  U
  4  5
+ 4  6
  9  1
  1
```

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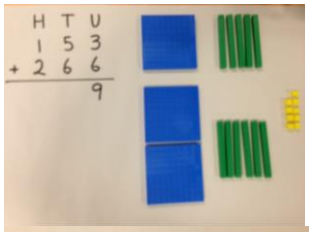
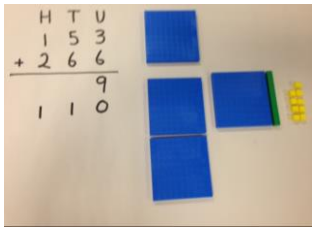
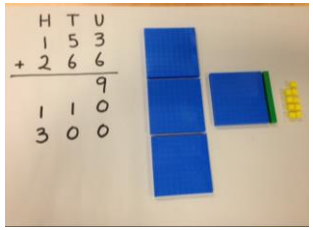
STAGE 6

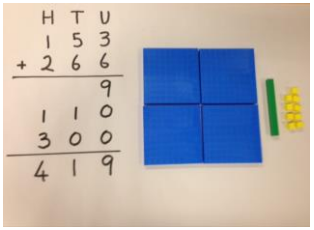
Continue to determine when calculations are best carried out using mental strategies.
Extend the standard written method to introduce the hundreds column, initially without and then introducing carrying, initially using expanded recording if appropriate.

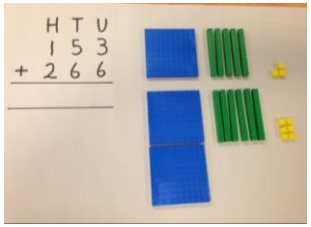
| | H | T | U |
|---|---|---|---|
| | 1 | 5 | 3 |
| + | 2 | 6 | 6 |
| | | | 9 |
| | 1 | 1 | 0 |
| | 3 | 0 | 0 |
| | 4 | 1 | 9 |

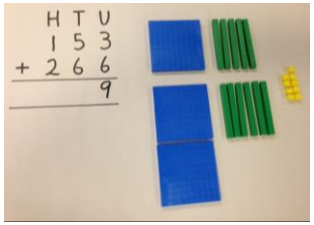


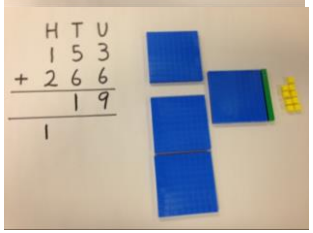


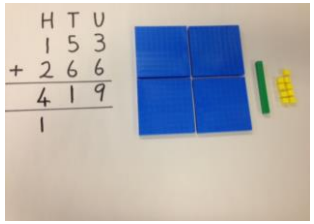













This becomes

| | H | T | U |
|---|---|---|---|
| | 1 | 5 | 3 |
| + | 2 | 6 | 6 |
| | 4 | 1 | 9 |
| | 1 | | |

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STAGE 7

Continue to determine when calculations are best carried out using mental strategies.

Develop use of the formal written method to addition of increasingly large numbers. Use expanded recording and apparatus as above to illustrate concept initially if required before moving towards the formal written method.

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