# HIAS Progression in Mental Strategies

**Addition and Subtraction**

Hampshire Maths Team
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Final version

# Overview

**This document gives a suggested guidance as to how mental strategies may be taught in all year groups showing clear progression from Year 3 to Year 6.**

**Points to consider when using this resource:**
Teachers should use this resource flexibly to meet the needs of individual pupils. Teachers should be familiar with previous year groups and ensure that children are secure with concepts and strategies before moving on. Reference has been made to the National Curriculum when developing this resource and the progression within the Big Ideas provided by the NCETM. This resource works alongside Hampshire Schemes of Learning Unit plans but can also complement a blocked curriculum approach.

This document focuses upon progression in the mental calculation strategies. Manipulatives and visual representations should be used to secure pupils conceptual understanding of the strategy. To support pupils in making their mathematical thinking visible, encourage the use of jottings or a number line. These strategies help pupils clarify their reasoning, communicate their ideas, and reflect on their problem-solving process. Further details of multi-representations to support conceptual understanding/ mental fluency are detailed in the unit plans referred to within this document.
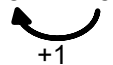
# Year 3

<table>
<tr><td><strong>Selected National Curriculum Statements</strong><br>Pupils should be taught to:<br><ul><li>add and subtract numbers mentally, including:<ul><li>a three-digit number and ones</li><li>a three-digit number and tens</li><li>a three-digit number and hundreds</li></ul></li></ul></td><td><strong>The Big Ideas (NCTEM)</strong><br>Relating numbers to 5 and 10 helps develop knowledge of the number bonds within 20. For example, given 8 + 7, thinking of 7 as 2 + 5, and adding the 2 and 8 to make 10, then the 5 to 15. This should then be applied when calculating with larger numbers.<br>Subtraction bonds can be thought of in terms of addition: for example, in answering 15 – 8, thinking what needs to be added to 8 to make 15. Counting on for subtraction is a useful strategy that can also be applied to larger numbers.</td></tr>
</table>

| Stage 1 | Stage 2 | End of Year Expectation |
|---|---|---|
| ***Recap Year 2*** <br><br> **Number bonds and deriving number bond up to 1000** <br><br> **If I know…, I know…** <br><br> 2 + 6 = 8 <br><br> 20 + 60 = 80 <br><br> 200 + 600 = 800 <br><br><br> 8 – 6 = 2 <br><br> 80 – 60 = 20 <br><br> 800 – 600 = 200 | **Partitioning 2-digit and 2-digit** <br><br> *Calculations should not include bridging.* <br><br> **24 + 35 = ?** <br><br> *20 + 30 = 50* <br><br> *4 + 5 = 9* <br><br> *50 + 9 = 59* <br><br><br> **75 – 42 = ?** <br><br> *70 – 40 = 30* <br><br> *5 – 2 = 3* <br><br> *30 + 3 = 33* | **Partitioning 3-digit and 3-digit** <br><br> *Calculations should not include bridging.* <br><br> **235 + 123 = ?** <br><br> *200 + 100 = 300* <br><br> *30 + 20 = 50* <br><br> *5 + 3 = 8* <br><br> *300 + 50 + 8 = 358* <br><br><br> **464 – 143 = ?** <br><br> *400 – 100 = 300* <br><br> *60 - 40 = 20* <br><br> *4 – 3 = 1* <br><br> *300 + 20 + 1 = 321* |

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# Year 4

| Selected National Curriculum Programme of Study Statements | The Big Ideas (NCETM) |
|---|---|
| Pupils should be taught to:<br>• Solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why. | It helps to round numbers before carrying out a calculation to get a sense of the size of the answer. For example, 4786 – 2135 is close to 5000 – 2000, so the answer will be around 3000. Looking at the numbers in a calculation and their relationship to each other can help make calculating easier. For example, 3012 – 2996. Noticing that the numbers are close to each other might mean this is more easily calculated by thinking about subtraction as difference. |

| Stage 1 | Stage 2 | End of Year Expectation |
|---|---|---|
| ***Recap Year 3***<br><br>**Number bonds and related number bond up to 10,000**<br><br>**If I know…, I know…**<br><br>2 + 6 = 8<br><br>20 + 60 = 80<br><br>200 + 600 = 800<br><br>2000 + 6000 = 8000<br><br>8 – 6 = 2<br><br>80 – 60 = 20<br><br>800 – 600 = 200<br><br>8000 – 6000 = 2000 | **Partitioning 3-digit and 3-digit**<br><br>*Calculations should not include bridging.*<br><br>**235 + 123 = ?**<br><br>*200 + 100 = 300*<br><br>*30 + 20 = 50*<br><br>*5 + 3 = 8*<br><br>*300 + 50 + 8 = 358*<br><br>**464 – 143 = ?**<br><br>*400 – 100 = 300*<br><br>*60 - 40 = 20*<br><br>*4 – 3 = 1*<br><br>*300 + 20 + 1 = 321* | **Partitioning 4-digit and 4-digit**<br><br>*Calculations should not include bridging.*<br><br>**2235 + 1054 = ?**<br><br>*2000 + 1000 = 3000*<br><br>*200 + 0 = 200*<br><br>*30 + 50 + 80*<br><br>*5 + 4 = 9*<br><br>*3000 + 200 + 80 + 9 = 3289*<br><br>**2935 - 1314 = ?**<br><br>*2000 – 1000 = 1000*<br><br>*900 – 300 = 600*<br><br>*30 – 10 = 20*<br><br>*5 – 4 = 1*<br><br>*1000 + 600 + 20 + 1 = 1621* |

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# Year 5

| Selected National Curriculum Programme of Study Statements | The Big Ideas (NCETM) |
|---|---|
| Pupils should be taught to:<br>• add and subtract numbers mentally with increasingly large numbers<br>•  use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy<br>• solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why. | Before starting any calculation is it helpful to think about whether or not you are confident that you can do it mentally. For example, 3689 + 4998 may be done mentally, but 3689 + 4756 may require paper and pencil.<br>Carrying out an equivalent calculation might be easier than carrying out the given calculation. For example 3682 – 2996 is equivalent to 3686 – 3000 (constant difference). |

| Stage 1 | Stage 2 | End of Year Expectation |
|---|---|---|
| *Recap Year 4*<br><br>**Number bonds and related number bond to 1,000,000**<br><br>**If I know…, I know…**<br>2 + 6 = 8<br>20 + 60 = 80<br>200 + 600 = 800<br>2000 + 6000 = 8000<br><br><br>**Partitioning 4-digits and 4-digits**<br><br>*Calculations should not include bridging.*<br><br>**2235 + 1054 = ?**<br>*2000 + 1000 = 3000*<br>*200 + 0 = 200*<br>*30 + 50 + 80*<br>*5 + 4 = 9*<br>*3000 + 200 + 80 + 9 = 3289* | **Round and adjust**<br><br>**258 + 399 = ?**<br><br>*398 ≈ 400*<br><br>*258 + 400 = 658*<br><br>*658 – 2 = 656*<br><br><br>**Number adjustment**<br><br>**329 + 426 = ?**<br><br>329 + 426<br><br>+1<br><br>330 + 425 = 755 | **Choosing efficient strategies**<br><br>*It's important that pupils are given opportunities to choose between mental and formal strategies when solving problems. This helps them develop flexibility in their thinking and deepens their understanding of number and operations. Encouraging them to reflect on which strategy is most efficient for a given context not only builds confidence but also promotes mathematical reasoning. Explore ways to incorporate more of these opportunities into lessons—perhaps through open-ended tasks or discussions around strategy choice?* |

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# Year 6

| Selected National Curriculum Programme of Study Statements | The Big Ideas (NCETM) |
|---|---|
| Pupils should be taught to: <br> • perform mental calculations, including with mixed operations and large numbers. <br> • solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why | Deciding which calculation method to use is supported by being able to take apart and combine numbers in many ways. For example, calculating 8·78 + 5·26 might involve calculating 8·75 + 5·25 and then adjusting the answer. <br> The associative rule helps when adding three or more numbers: 367 + 275 + 525 is probably best thought of as 367 + (275 + 525) rather than (367 + 275) + 525. |

| Stage 1 | Stage 2 | End of Year Expectation |
|---|---|---|
| *Recap Year 5* <br><br> **Round and adjust** <br><br> **258 + 399 = ?** <br><br> *398 ≈ 400* <br><br> *258 + 400 = 658* <br><br> *658 − 2 = 656* <br><br><br> **Number adjustment** <br><br> **329 + 426 = ?** <br><br> 329 + 426 <br> ↷ <br> +1 <br><br> 330 + 425 = 755 | **Round and adjust with increasingly larger numbers** <br><br> **4258 + 2997 = ?** <br><br> *2997 ≈ 3000* <br><br> *4258 + 3000 = 7258* <br><br> *7258 − 3 = 7255* <br><br><br> **Number adjustment with increasingly larger numbers** <br><br> **2399 + 1425 = ?** <br><br> 2399 + 1425 <br> ↷ <br> +1 <br><br> 2400 + 1424 = 3824 | **Choosing efficient strategies** <br><br> *It's important that pupils are given opportunities to choose between mental and formal strategies when solving problems. This helps them develop flexibility in their thinking and deepens their understanding of number and operations. Encouraging them to reflect on which strategy is most efficient for a given context not only builds confidence but also promotes mathematical reasoning. Explore ways to incorporate more of these opportunities into lessons—perhaps through open-ended tasks or discussions around strategy choice?* |

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