**Number**: Sets and Operations

**10. Addition 2**

This unit focuses on choosing efficient strategies to solve addition problems, both without and with renaming. Strategies revisited include mental methods such as making numbers ‘friendlier’ and partitioning numbers into tens and ones and adding each in turn, and the column method.

**Unit Information**

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| **Learning** **Outcome(s)** | Through appropriately playful and engaging learning experiences, children should be able to select, make use of and represent a range of addition and subtraction strategies. |
| **Mathematical Concept(s)** | * Numbers and symbols are used to construct and express number sentences. These can help to solve problems or are used to express contexts mathematically.
* When combining or partitioning numbers, we sometimes need to exchange tens to units, or hundreds to tens where necessary.
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| **Mathematical Language** | number, most, fewest, pair, together, more than, less than, number sentence, addition sentence, addition problem, method, column addition, partition, combine, ones, tens |
| **Prior** **Knowledge** | * Basic number sense: counting, ordering, comparing, recognition and understanding of number patterns and relationships
* Addition strategies including making numbers friendlier, partitioning numbers into tens and ones and the column method.
* Understanding the place value of numbers up to 100, including partitioning into tens and ones and exchanging ten ones for one ten and one ten for ten ones.
* Experience with interpreting and solving word problems.
* Some experience choosing suitable strategies to solve addition problems.
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| **Potential****Misconceptions** | * The place value of a digit is not important. [Children must take care to attribute the correct value to each digit in a calculation.]
* Every strategy works in every situation. [The numbers in some problems will not suit every strategy, for example, it is not always possible to ‘make 10’.]
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**Unit Overview**

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|  | **Lesson 1** | **Lesson 2** | **Lesson 3** | **Lesson 4** | **Lesson 5** |
| **Focus of New Learning** | Choose efficient strategies to solve addition problems, without renaming. | Choose efficient strategies to solve addition problems, with renaming. | Use column addition to solve addition problems with renaming.  | Continue to explore column addition to solve addition problems. | Consolidate learning. |
| **Slides** | 10.1 | 10.2 | 10.3 | 10.4 |  |
| **Book** | p. 60 | p. 61 | p. 62 | p. 62 | pp. 64–65 |
| **Concrete****Resources** | 100-squareDienes blocks: tens and ones | 100-squareDienes blocks: tens and ones | 100-squareDienes blocks: tens and ones | 100-squareDienes blocks: tens and ones | 100-squareDienes blocks: tens and ones |

**Additional Digital Resources**

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| * 10. Addition 2: Video
* 10. Addition 2: Game
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**Lesson 1: Choose efficient strategies to solve addition problems without renaming.** Teaching Slides 10.1 | Student Book p. 60

**Learning Experiences and Anticipated Student Responses**

This lesson is designed to encourage the most efficient method for each addition problem. The numbers have been chosen to work well with mental methods, but children can use the column method if they wish. Jottings to support mental methods, e.g. in a copy or on a mini whiteboard, may be useful at this stage. Concrete resources should also be made available for children who need them e.g. 100-squares and Dienes blocks.

**Warm Up:**

* In response to the maths talk question, children may notice things such:
	+ There are six different prizes.
	+ All the ticket numbers have a 0 in the ones place, apart from 99 and 25.
	+ You need the same number of tickets for one ball as two bags of marbles.

**Problem with Modelled Strategies:**

* Use the problem and key questions on the slide to model thinking through a problem.
* As children work on the problem, encourage them to focus on how they add the numbers.
* In response to the maths talk question, children may describe strategies such as:
	+ I used a 100-square. I started at 43, then I moved down 5 rows and over 1 column.
	+ I made the numbers friendlier. I took the 1 from 51 and gave it to 43 so then I had 44 + 50 = 94.
	+ First, I added the tens (40 + 50 = 90). Then I added the ones (3 + 4 = 4). Then I put them together (90 + 4 = 94).
* Invite children to respond to the strategies their classmates share. Ask them if they did something similar or different. Would they try a different strategy next time and why?
* The slides include modelled versions of the ‘make numbers friendlier’ and ‘add the tens first and then the ones’ strategies, which can be used if desired to show examples of efficient methods.

**Part A, B and C:**

* Encourage children to think about the best strategies to use for each addition.
* Children are not expected to find all possible answers to Part A and B, but early finishers could be encouraged to find more possibilities.

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| **Anticipated Student Responses** |
| **Part A:**Ava and Mia (12 + 51 = 63)Conor and Milly (24 + 42 = 66)Conor and Noah (24 + 43 = 67)Conor and Mia (41 + 51 = 71)Milly and Noah (42 + 43 = 85)Milly and Mia (42 + 51 = 93)Noah and Mia (43 + 51 = 94) | **Part B:**Conor and Mia (41 + 51 = 71)Milly and Noah (42 + 43 = 85)Milly and Mia (42 + 51 = 93)Noah and Mia (43 + 51 = 94) | **Part C:**Ava, Milly and Noah(12 + 42 + 43 = 97) |

* In response to the maths talk question after Part B, children may describe a variety of different strategies. See examples above. Probe them on whey they used the strategy they chose.
* In response to the maths talk question before Part C, children may use estimation to eliminate groups of numbers that would be too low (e.g. 12 + 24 + 42), and those that would be too high (e.g. 51 + 43 + 42). They may choose to focus on just the ones, knowing they are looking for a total of 7 in the ones place.

**Extension Activity:**

* The extension provides further opportunities for children to use addition strategies.

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| **Anticipated Student Responses** |
| Ava and Mia (12 + 51 = 63)Conor and Milly (24 + 42 = 66) | Conor and Noah (24 + 43 = 67)Conor and Mia (24 + 51 = 75) | Milly and Noah (42 + 43 = 85) |

**Lesson 2: Choose efficient strategies to solve addition problems with renaming.**

Teaching Slides 10.2 | Student Book p. 61

**Learning Experiences and Anticipated Student Responses**

Similar to Lesson 1, this lesson is designed to encourage the most efficient method for each addition problem, this time with renaming.

**Warm Up:**

* Use the pair of numbers to explore strategies for adding numbers with renaming.

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| **Anticipated Student Responses** |
| 36 + 27 = 63 |

* In response to the maths talk question, children may describe strategies such as:
	+ I used a 100-square. I started at 36, then I moved down 2 rows and counted on 7.
	+ I made the numbers friendlier. I partitioned 27 into 20 + 4 + 3. Then I added 36 + 4 = 40 and 20 + 3 = 23. Then I added 40 + 23 = 63.
	+ First, I added the tens (30 + 20 = 50). Then I added the ones (6 + 7 = 13). Then I put them together (50 + 13 = 63).
* Invite children to respond to the strategies their classmates share. Ask them if they did something similar or different. Would they try a different strategy next time and why?
* The slides include modelled versions of the ‘add the tens first and then the ones’ and ‘make numbers friendlier’ strategies, which can be used if desired to show examples of efficient methods.

**Number Mat Exploration:**

* In response to the maths talk question, children may notice things such as:
	+ There is only one 1-digit number.
	+ The numbers are in order from smallest to greatest.
	+ The numbers are all less than 56.

**Part A:**

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| **Anticipated Student Responses** |
| 18 + 55 = 7321 + 53 = 74 | 21 + 55 = 7625 + 46 = 71 | 25 + 53 = 7834 + 42 = 76 | 34 + 43 = 7736 + 42 = 78 | 36 + 43 = 79 |

* In response to the maths talk question, children may say they used estimation to choose pairs of numbers that were likely to have a total between 70 and 80 (e.g. 25 + 53) or focused specifically on the tens and whether they would add to 70 or 80.

**Part B:**

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| **Anticipated Student Responses** |
| 6 + 36 + 55 = 97 | 18 + 25 + 55 = 98 | 18 + 34 + 46 = 98 | 14 + 42 + 43 = 99 | 21 + 36 + 42 = 99 |

* In response to the maths talk question about Wind’s statement, look for answers based on beginning with the bigger number or digit.
* In response to the maths talk questions about how children found their solutions, encourage them to share the strategies they used, both in terms of the numbers they chose, and how they added them.

**Extension Activity:**

* The extension offers further use of the number mat for addition.
* Providing choice here facilitates differentiation. Encourage children who need extra support to choose smaller numbers, and those who are able for a greater challenge to choose bigger numbers. There is also flexibility in the number of addends each child uses to reach the target, it could be two, three or more.

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| **Anticipated Student Responses** |
| Answers will depend on the target number children choose. |

**Lesson 3: Use column addition to solve addition problems with renaming.**

Teaching Slides 10.3 | Student Book p. 62

**Learning Experiences and Anticipated Student Responses**

This lesson provides an opportunity to explicitly revise the column method for addition, with renaming. Children are encouraged to check their answers using a different strategy to further develop their mental methods. … Encourage them to consider which method was most efficient.

**Column Addition Revision:**

* The slides provide examples and modeling to revise column addition.
* Use the mistakes the characters have made to address common mistakes such as forgetting to carry the 1 and writing the carried 1 in the wrong place.
* In response to the maths talk question on Brain’s slide, children may say that 40 is a good estimate because both 17 and 16 are close to 20, and 20 + 20 = 40. Alternatively, they may say that 30 is a good estimate as both 17 and 16 are close to 15, and 15 + 15 = 30.
* In response to the maths talk question on Blaze slide, children may say that 40 is a good estimate because 29 is close to 30 and 13 is close to 10, and 30 + 10 = 40. Encourage them to share the strategies they used to check the calculation.

**Part A:**

* Encourage children to estimate before completing each calculation.

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| **Anticipated Student Responses** |
| 29 + 27 = 56 | 34 + 28 = 62 | 28 + 26 + 9 = 63 |

* In response to the maths talk question, encourage children to share their strategies and reflect on which strategy was more efficient in each case e.g. I think making the numbers friendlier was better for adding 29 + 27 because the numbers were close to 30. It took longer to use the column method.

**Part B:**

* Providing choice here facilitates differentiation. It also allows children to reflect on which numbers are easier to add.

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| **Anticipated Student Responses** |
| Answers will depend on the scoops children choose. |

* In response to the maths talk questions, encourage children to look closely at the numbers and discuss which work well for mental strategies, and which may be easier to add using the column method.

**Extension Activity:**

* The extension builds on the context and addition work children have been doing in the lesson, without limits on the flavours or numbers of scoops children can choose. This allows scope for differentiation.

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| **Anticipated Student Responses** |
| Answers will depend on the scoops children choose. |

**Lesson 4: Continue to explore column addition to solve addition problems.**

Teaching Slides 10.4 | Student Book p. 63

**Learning Experiences and Anticipated Student Responses**

This lesson provides further opportunities to revise and consolidation column addition.

**Column Addition Practice:**

* The slides provide sums for column addition practice.
* Children can use copies or mini whiteboards to work on each one.
* Encourage children to estimate first, and then use another method to check their answers.

**Part A:**

* Draw children’s attention to the small ‘1’ in the tens column.

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| **Anticipated Student Responses** |
| 37 + 24 = 61 *or* 27 + 34 = 61 |

* In response to the maths talk question, encourage children to discuss the strategy they used.

**Part B:**

* Draw children’s attention to the small ‘1’ in the tens column.
* There are many possible solutions to this question. You can decide if a ‘0’ digit card must be used before a 1-digit number or if it can just be left blank. Leaving it blank is more natural and opens up more possible solutions. Using the ‘0’ digit card limits the possible solutions.

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| **Anticipated Student Responses** |
| 34 + 16 = 50 / 16 + 34 = 5036 + 14 = 50 / 14 + 36 = 50 | 25 + 6 = 31 / 6 + 25 = 3126 + 5 = 31 / 5 + 26 = 3135 + 6 = 41 / 6 + 35 = 4136 + 5 = 41 / 5 + 36 = 41 | Not permissible if 0 has to be used before a 1-digit number as it would mean using the ‘0’ card twice:24 + 6 = 30 / 6 + 24 = 3026 + 4 = 30 / 4 + 26 = 3014 + 6 = 20 / 6 + 14 = 2016 + 4 = 20 / 4 + 16 = 20 |

* In response to the maths talk question, children may have noticed:
	+ The ones digits must always add to 10 or more (so that 1 ten is carried over to the tens column).
	+ There are two pairs of addends for each possible total, in which the ones digits are swapped, e.g. 3**4** + 1**6** and 3**6** + 1**4**.

**Part C:**

* There are many possible solutions to this question. As per Part B, you can decide if a ‘0’ digit card must be used before a 1-digit number or if it can just be left blank.

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| **Anticipated Student Responses** |
| Answers will depend on the cards children choose. |

**Extension Activity:**

* The extension requires children to look back on what they have done in Part C and create a calculation that does not require renaming. If they have already found one in Part C, ask them to find another.

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| **Anticipated Student Responses** |
| Answers will depend on the cards children choose. |

**Lesson 5: Consolidate learning.**

Student Book pp. 64–65

**Learning Experiences and Anticipated Student Responses**

Encourage children to use 100-squares, Dienes blocks or other resources of their choice if they require them to complete the activities on this spread. Mini whiteboards may also be useful for rough work.

**Part A, p. 64:**

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| **Anticipated Student Responses** |
| 27 + 21 = 4846 + 13 = 59 | 25 + 31 = 5613 + 71 = 84 | 64 + 24 = 88 |

**Part B, p. 64:**

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| **Anticipated Student Responses** |
| 1. 59
 | 1. 58
 | 1. 66
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**Part C, p. 64:**

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| **Anticipated Student Responses** |
| 97 | 109 | 72 | 90 |

**Part A, p. 65:**

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| **Anticipated Student Responses** |
| 34 + 49 = 8339 + 36 = 75 | 25 + 38 = 6347 + 29 = 76 | 28 + 46 = 7455 + 27 = 82 |

**Part B, p. 95:**

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| **Anticipated Student Responses** |
| 79 | 52 | 98 | 91 |