**MATHEMATICS STAGE 2**

**TEACHING AND LEARNING OVERVIEW**

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| TERM: 1 | WEEK: 5 | STRAND:Number and Algebra | **SUB-STRAND:**  **Addition and Subtraction 1** | **WORKING MATHEMATICALLY:**  **MA2-1WM, MA2-2WM, MA2-3WM** |
| OUTCOMES: | | * uses appropriate terminology to describe, and symbols to represent, mathematical ideas MA2-1WM * selects and uses appropriate mental or written strategies, or technology, to solve problems MA2-2WM * checks the accuracy of a statement and explains the reasoning used MA2-3WM * uses mental and written strategies for addition and subtraction involving two-, three-, four- and five-digit numbers MA2-5NA | | |
| **CONTENT:** | | Students:  **Recall addition facts for single-digit numbers and related subtraction facts to develop increasingly efficient mental strategies for computation** (ACMNA055)  add three or more single-digit numbers  apply known single-digit addition and subtraction facts to mental strategies for addition and subtraction of two-, three- and four-digit numbers, including: CCT  the compensation strategy, eg 63 + 29: 63 + 30 = 93, subtract 1 to obtain 92  bridging the decades, eg 34 + 26: 34 + 6 = 40, 40 + 20 = 60  select, use and record a variety of mental strategies to solve addition and subtraction problems, including word problems, with numbers of up to four digits CCT  give a reasonable estimate for a problem, explain how the estimate was obtained, and check the solution (Communicating, Reasoning) CCT  **Recognise and explain the connection between addition and subtraction** (ACMNA054)  demonstrate how addition and subtraction are inverse operations  explain and check solutions to problems, including by using the inverse operation CCT  **Represent money values in multiple ways and count the change required for simple transactions to the nearest five cents** (ACMNA059) | | |
| ASSESSMENT FOR LEARNING (PRE-ASSESSMENT) | | **Review the compensation strategy.**  **Two and three digit addition and subtraction** Provide the students with a blank piece of paper and ask them to fold the paper into quarters. Write on the board two addition and two subtraction problems, eg 40 + 29, 348 + 200, 90 – 49 and 600 – 2341.  Ask the students to solve each problem, using a quarter of the paper, recording the strategy they used. | | |
| WARM UP / DRILL | | Race to 100: students roll two dice and with the two numbers they can add or subtract them to get a number. Repeat this 5 times and the student who gets closest to 100 wins | | |
| TENS ACTIVITYNEWMAN’S PROBLEMINVESTIGATION | | Julia played tag with 12 kids on Monday. She played tag with 7 kids on Tuesday. How many kids did she play with altogether? | | |
| QUALITY TEACHING ELEMENTS | | **INTELLECTUAL QUALITY** | **QUALITY LEARNING ENVIRONMENT** | **SIGNIFICANCE** |
| * Deep knowledge * Deep understanding * Problematic knowledge * Higher-order thinking * Metalanguage * Substantive communication | * Explicit quality criteria * Engagement * High expectations * Social support * Students’ self-regulation * Student direction | * Background knowledge * Cultural knowledge * Knowledge integration * Inclusivity * Connectedness * Narrative |
| RESOURCES | | Base ten materials, place value charts, hundreds chart, empty number lines. | | |

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| WHOLE CLASS INSTRUCTION MODELLED ACTIVITIES | GUIDED & INDEPENDENT ACTIVITIES | |
| Modelled Activities\*choose and apply efficient strategies for addition and subtraction (Problem Solving) \*discuss and compare different methods of addition and subtraction (Communicating) Write on the board 46 + 9 = □ focusing on the compensation strategy. Model how to add ten and count back one.  For example 46 + 10 = 56, count back 1 = 55. Repeat, modelling 48 – 9.  Use a hundreds chart to aid explanation: to add 9 move down one line and one space to the left, to subtract 9, move up one line and one space to the right. Provide similar examples for students to model.  https://www.det.nsw.edu.au/eppcontent/glossary/app/resource/image/77.png?w=473For 52 + 39, think, “52 plus 40 is 92, but I added 1 too many to take me to the next 10, so I subtract one from my answer to get 91.”  For 345 + 198, think, “345 + 200 is 545, but I added 2 too many; so subtract 2 from 545 to get 543.” | LEARNING SEQUENCERemediation | Place Value Game:  Students receive a place value chart, roll a dice two times a create a number, then make that number using base 10 materials. When students have made two numbers they add them together using the base 10 materials. |
| LEARNING SEQUENCE | **Mental Strategies**  Students are asked to calculate 34 + 17 in their heads. They are then asked to record the strategy they used. This process is repeated for other problems, such as:  73 – 25 162 – 69  63 + 29 188 – 89  Students discuss which methods are the most efficient.  Possible questions include:  - is there a better strategy?  - what is the best method to find a solution to this problem?  **Estimating Differences**  The teacher shows a card with the subtraction of a pair of two-digit numbers eg 78 – 32. Students estimate whether the difference between the numbers is closer to 10, 20, 30, 40 or 50 and give reasons why. The teacher shows other cards eg 51 – 18, 60 – 29, 43 – 25, 33 – 25. Students estimate the differences and discuss their strategies. They are asked to think about rounding numbers on purpose.  For example for 51 – 18, students may round 51 down to 50 and 18 up to 20.  Explain and check solutions to problems, including by using the inverse operation  **Recording on Empty Number Lines**  Students are shown the number sentence 157 + 22 and an empty number line. The teacher marks the number 157 on the number line.  Possible questions include:  - what is the next multiple of ten after 157?  - how many do you add on to get that number?  Students record their answers on the number line. Possible questions include:  - can you work it out with fewer steps?  - can you visualise the number line in your head and do it?  - can you write the numbers on paper to help you keep track?  **‘What Number Am I’**  Students design ‘What Number Am I?’ problems using five clues that utilise the compensation strategy. For example: I am greater than 45 + 9, I am less than 76 – 9  **Tracks**  Organise the students into pairs and provide them with a copy of *Tracks*  BLM, a set of numeral cards 0–9 and a hundred chart. Have the students  take turns to draw two cards from the deck to make a two-digit number.  The student who has drawn the cards records this number on the  “Tracks” sheet as their starting number. The partner then fills in the  boxes on the sheet with three directional arrows. These arrows indicate  if the student is to:    The first student locates the starting number on the hundred chart and  follows the directional arrows to determine the number they would  finish on.    **Developing Efficient Numeracy Strategies 2 (DENS 2) pg 86-87**  Tracks Blackline Master pg 154  **Two and three digit addition and subtraction** Provide the students with a blank piece of paper and ask them to fold the paper into quarters. Write on the board two addition and two subtraction problems, eg 40 + 29, 348 + 200, 90 – 49 and 600 – 2341.  Ask the students to solve each problem, using a quarter of the paper, demonstrating the compensation strategy. |
| LEARNING SEQUENCEExtension | **Estimating Addition of Three-Digit Numbers**  The teacher briefly displays the numbers 314, 311, 310, 316, 312 on cards, then turns the cards over so that the numbers cannot be seen. Students are asked to estimate the total and give their reasons. The teacher reveals the numbers one at a time so that the students can find the total. The task could be repeated with other three-digit numbers and with four-digit numbers. |
| **EVALUATION & REFLECTION** | Student engagement: Achievement of outcomes:  Resources: Follow up: |

* All assessment tasks should be written in **red** and planning should be based around developing the skills to complete that task.
* Assessment rubrics or marking scale should be considered.

**MATHEMATICS STAGE 2**

**TEACHING AND LEARNING OVERVIEW**

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| --- | --- | --- | --- | --- |
| TERM: 1 | WEEK: 6 | STRAND:Number and Algebra | **SUB-STRAND:**  **Addition and Subtraction 1** | **WORKING MATHEMATICALLY:**  **MA2-1WM, MA2-2WM, MA2-3WM** |
| OUTCOMES: | | * uses appropriate terminology to describe, and symbols to represent, mathematical ideas MA2-1WM * selects and uses appropriate mental or written strategies, or technology, to solve problems MA2-2WM * checks the accuracy of a statement and explains the reasoning used MA2-3WM * uses mental and written strategies for addition and subtraction involving two-, three-, four- and five-digit numbers MA2-5NA | | |
| **CONTENT:** | | Students:  **Recall addition facts for single-digit numbers and related subtraction facts to develop increasingly efficient mental strategies for computation** (ACMNA055)  add three or more single-digit numbers  apply known single-digit addition and subtraction facts to mental strategies for addition and subtraction of two-, three- and four-digit numbers, including: CCT  the compensation strategy, eg 63 + 29: 63 + 30 = 93, subtract 1 to obtain 92  bridging the decades, eg 34 + 26: 34 + 6 = 40, 40 + 20 = 60  select, use and record a variety of mental strategies to solve addition and subtraction problems, including word problems, with numbers of up to four digits CCT  give a reasonable estimate for a problem, explain how the estimate was obtained, and check the solution (Communicating, Reasoning) CCT  use concrete materials to model the addition and subtraction of two or more numbers, with and without trading, and record the method used  **Recognise and explain the connection between addition and subtraction** (ACMNA054)  demonstrate how addition and subtraction are inverse operations  explain and check solutions to problems, including by using the inverse operation CCT  **Represent money values in multiple ways and count the change required for simple transactions to the nearest five cents** (ACMNA059) | | |
| ASSESSMENT FOR LEARNING (PRE-ASSESSMENT) | | **Two and three digit addition and subtraction** Provide the students with a blank piece of paper and ask them to fold the paper into quarters. Write on the board two addition and two subtraction problems, eg 40 + 29, 348 + 200, 90 – 49 and 600 – 2341.  Ask the students to solve each problem, using a quarter of the paper, recording the strategy they used. | | |
| WARM UP / DRILL | | Race to 100: students roll two dice and with the two numbers they can add or subtract them to get a number. Repeat this 5 times and the student who gets closest to 100 wins | | |
| TENS ACTIVITYNEWMAN’S PROBLEMINVESTIGATION | | I added two numbers together, each with two digits. I got the answer 84, what might the numbers be? | | |
| QUALITY TEACHING ELEMENTS | | **INTELLECTUAL QUALITY** | **QUALITY LEARNING ENVIRONMENT** | **SIGNIFICANCE** |
| * Deep knowledge * Deep understanding * Problematic knowledge * Higher-order thinking * Metalanguage * Substantive communication | * Explicit quality criteria * Engagement * High expectations * Social support * Students’ self-regulation * Student direction | * Background knowledge * Cultural knowledge * Knowledge integration * Inclusivity * Connectedness * Narrative |
| RESOURCES | | Place value chart, dry beans or similar material, DENS stage 2 book, Teeny Tiny Ten Frames, 0-9 numeral cards, number charts | | |

**TEACHING AND LEARNING EXPERIENCES**

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| WHOLE CLASS INSTRUCTION MODELLED ACTIVITIES | GUIDED & INDEPENDENT ACTIVITIES | |
| Modelled Activities **Whole class activities**  **\*choose and apply efficient strategies for addition and subtraction (Problem Solving) \*discuss and compare different methods of addition and subtraction (Communicating)**  **bridging the decades**  Draw a table like this on the board:   |  |  |  | | --- | --- | --- | | Hundreds | Tens | Ones | |  |  |  | |  |  |  |   Write the numbers 425 and 214 in the empty boxes. Ask students to estimate the answer to this addition. Model each number with base ten blocks (remind students a block = 1000, a flat = 100, a long = 10, a mini = 1) and add them, exchanging where necessary. Repeat activity with more numbers.  Using an abacus, model 456 and add discs to show + 132. Repeat, asking students to show 354 + 235, 1743 + 2434 and 3521 + 2314  Ask students to discuss which materials they found most useful to show addition. | LEARNING SEQUENCERemediation | **Place Value Game:**  Students receive a place value chart, roll a dice two times a create a number, then make that number using base 10 materials. When students have made two numbers they add them together using the base 10 materials.  **Bean Counter**  Present the students with a large quantity of dry beans or other similar material that can be stored in small containers. Ask students to estimate the number of beans. Have the students count out ten beans and place the beans into a container. Students continue until all beans have been placed into groups of ten. Encourage the students to find the total number by counting by tens and then adding any remaining single units.  DENS 2 pg 70-71 |
| LEARNING SEQUENCE Draw a table like this on the board:   |  |  |  | | --- | --- | --- | | Hundreds | Tens | Ones | |  |  |  | |  |  |  |   Write the numbers 564 and 321 in the empty boxes. Ask students to estimate the answer to this subtraction. Model each number with base ten blocks (remind students a block = 1000, a flat = 100, a long = 10, a mini = 1) and add them, exchanging where necessary. Repeat activity with more numbers. | Provide students with blocks and ask them to make 236 and 148.  Questions:   * What do we need to do with the minis? (exchange) * What strategy could we use to add?   Put the longs together and write 384. Ask students to check they have that. Repeat with 364 and 173, asking students to exchange longs. Ask students to make their own addition problems and solve with the materials.  **Teeny Tiny Ten-Frames**  Provide the students with a set of *Teeny tiny ten-frames*. Nominate a two digit number and ask the students to represent the number using the ten-frames. Have the students share how they made the number. Ask the students to make a second two-digit number. Repeat the questioning.  Have the students find the total of the two numbers using the ten-frames.  Discuss how they solved the addition.  **Variation**  Make the first number and then cover it up. Make the second number and  use the material to determine the total of both numbers.  **DENS 2** pg 90-91  **‘Highest Number Wins’**  In pairs student shuffle their own set of 0-9 numeral cards and turn over the top card. Ask them to write the number in one of the empty boxes of their place value grid.   |  |  |  | | --- | --- | --- | | Hundreds | Tens | Ones | |  |  |  | |  |  |  |   Ask them to continue turning over cards and writing the number shown in all the boxes until all the boxes are filled. Students then use blocks to add their numbers. The person with the highest number wins.  ‘Lowest Number Wins’  In pairs student shuffle their own set of 0-9 numeral cards and turn over the top card. Ask them to write the number in one of the empty boxes of their place value grid.   |  |  |  | | --- | --- | --- | | Hundreds | Tens | Ones | |  |  |  | |  |  |  |   Ask them to continue turning over cards and writing the number shown in all the boxes until all the boxes are filled. Students then use blocks to subtract their numbers. The person with the lowest number wins.  **Number Charts** (1-1000)  Children learn to add and subtract ones and tens by moving left, right, up and down on charts with numbers up to 1000 eg 45 + 20 etc  **Number Cards**  Students make number cards from 1 to 9 as shown.    Students use these cards to make two three-digit numbers that add to give the largest total possible and the smallest total possible eg Given 4, 5, 2 and 3, 1, 6:  Largest total possible is 542 + 631 = 1173  Smallest total possible is 245 + 136 = 381  Students arrange the cards to make three three-digit numbers that add up to 999. Students are challenged to find as many solutions as they can.  Explain and check solutions to problems, including by using the inverse operation |
| LEARNING SEQUENCEExtension | **The Answer Is …**  Students construct subtraction number sentences with the answer 123. Students are challenged to include number sentences involving four-digit numbers. |
| **EVALUATION & REFLECTION** | Student engagement: Achievement of outcomes:  Resources: Follow up: |

* All assessment tasks should be written in **red** and planning should be based around developing the skills to complete that task.
* Assessment rubrics or marking scale should be considered.

**MATHEMATICS STAGE 2**

**TEACHING AND LEARNING OVERVIEW**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| TERM: 1 | WEEK: 7 | STRAND:Number and Algebra | **SUB-STRAND:**  **Addition and Subtraction 1** | **WORKING MATHEMATICALLY:**  **MA2-1WM, MA2-2WM, MA2-3WM** |
| OUTCOMES: | | * uses appropriate terminology to describe, and symbols to represent, mathematical ideas MA2-1WM * selects and uses appropriate mental or written strategies, or technology, to solve problems MA2-2WM * checks the accuracy of a statement and explains the reasoning used MA2-3WM * uses mental and written strategies for addition and subtraction involving two-, three-, four- and five-digit numbers MA2-5NA | | |
| **CONTENT:** | | Students:  **Recall addition facts for single-digit numbers and related subtraction facts to develop increasingly efficient mental strategies for computation** (ACMNA055)  add three or more single-digit numbers  apply known single-digit addition and subtraction facts to mental strategies for addition and subtraction of two-, three- and four-digit numbers, including: CCT  the compensation strategy, eg 63 + 29: 63 + 30 = 93, subtract 1 to obtain 92  bridging the decades, eg 34 + 26: 34 + 6 = 40, 40 + 20 = 60  select, use and record a variety of mental strategies to solve addition and subtraction problems, including word problems, with numbers of up to four digits CCT  give a reasonable estimate for a problem, explain how the estimate was obtained, and check the solution (Communicating, Reasoning) CCT  use concrete materials to model the addition and subtraction of two or more numbers, with and without trading, and record the method used  **Recognise and explain the connection between addition and subtraction** (ACMNA054)  demonstrate how addition and subtraction are inverse operations  explain and check solutions to problems, including by using the inverse operation CCT  **Represent money values in multiple ways and count the change required for simple transactions to the nearest five cents** (ACMNA059) | | |
| ASSESSMENT FOR LEARNING (PRE-ASSESSMENT) | | **Two and three digit addition and subtraction** Provide the students with a blank piece of paper and ask them to fold the paper into quarters. Write on the board two addition and two subtraction problems, eg 40 + 29, 348 + 200, 90 – 49 and 600 – 2341.  Ask the students to solve each problem, using a quarter of the paper, recording the strategy they used. | | |
| WARM UP / DRILL | | Race to 100: students roll two dice and with the two numbers they can add or subtract them to get a number. Repeat this 5 times and the student who gets closest to 100 wins | | |
| TENS ACTIVITYNEWMAN’S PROBLEMINVESTIGATION | | I added two numbers together, each with two digits. I got the answer 84, what might the numbers be? | | |
| QUALITY TEACHING ELEMENTS | | **INTELLECTUAL QUALITY** | **QUALITY LEARNING ENVIRONMENT** | **SIGNIFICANCE** |
| * Deep knowledge * Deep understanding * Problematic knowledge * Higher-order thinking * Metalanguage * Substantive communication | * Explicit quality criteria * Engagement * High expectations * Social support * Students’ self-regulation * Student direction | * Background knowledge * Cultural knowledge * Knowledge integration * Inclusivity * Connectedness * Narrative |
| RESOURCES | | Place value chart, beans (or other small items to be placed into counters), teeny tiny tens frame, 0-9 numeral cards, DENS | | |

**TEACHING AND LEARNING EXPERIENCES**

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| WHOLE CLASS INSTRUCTION MODELLED ACTIVITIES | GUIDED & INDEPENDENT ACTIVITIES | |
| Modelled Activities **Whole class activities**  **\*choose and apply efficient strategies for addition and subtraction (Problem Solving) \*discuss and compare different methods of addition and subtraction (Communicating)**  **bridging the decades**  Draw a table like this on the board:   |  |  |  | | --- | --- | --- | | Hundreds | Tens | Ones | |  |  |  | |  |  |  |   Write the numbers 425 and 214 in the empty boxes. Ask students to estimate the answer to this addition. Model each number with base ten blocks (remind students a block = 1000, a flat = 100, a long = 10, a mini = 1) and add them, exchanging where necessary. Repeat activity with more numbers.  Using an abacus, model 456 and add discs to show + 132. Repeat, asking students to show 354 + 235, 1743 + 2434 and 3521 + 2314  Ask students to discuss which materials they found most useful to show addition. | LEARNING SEQUENCERemediation | **Place Value Game:**  Students receive a place value chart, roll a dice two times a create a number, then make that number using base 10 materials. When students have made two numbers they add them together using the base 10 materials.  **Bean Counter**  Present the students with a large quantity of dry beans or other similar material that can be stored in small containers. Ask students to estimate the number of beans. Have the students count out ten beans and place the beans into a container. Students continue until all beans have been placed into groups of ten. Encourage the students to find the total number by counting by tens and then adding any remaining single units.  DENS 2 pg 70-71 |
| LEARNING SEQUENCE Draw a table like this on the board:   |  |  |  | | --- | --- | --- | | Hundreds | Tens | Ones | |  |  |  | |  |  |  |   Write the numbers 564 and 321 in the empty boxes. Ask students to estimate the answer to this subtraction. Model each number with base ten blocks (remind students a block = 1000, a flat = 100, a long = 10, a mini = 1) and add them, exchanging where necessary. Repeat activity with more numbers. | Provide students with blocks and ask them to make 236 and 148.  Questions:   * What do we need to do with the minis? (exchange) * What strategy could we use to add?   Put the longs together and write 384. Ask students to check they have that. Repeat with 364 and 173, asking students to exchange longs. Ask students to make their own addition problems and solve with the materials.  **Teeny Tiny Ten-Frames**  Provide the students with a set of *Teeny tiny ten-frames*. Nominate a two digit number and ask the students to represent the number using the ten-frames. Have the students share how they made the number. Ask the students to make a second two-digit number. Repeat the questioning.  Have the students find the total of the two numbers using the ten-frames.  Discuss how they solved the addition.  **Variation**  Make the first number and then cover it up. Make the second number and  use the material to determine the total of both numbers.  **DENS 2** pg 90-91  ‘Highest Number Wins’  In pairs student shuffle their own set of 0-9 numeral cards and turn over the top card. Ask them to write the number in one of the empty boxes of their place value grid.   |  |  |  | | --- | --- | --- | | Hundreds | Tens | Ones | |  |  |  | |  |  |  |   Ask them to continue turning over cards and writing the number shown in all the boxes until all the boxes are filled. Students then use blocks to add their numbers. The person with the highest number wins.  ‘Lowest Number Wins’  In pairs student shuffle their own set of 0-9 numeral cards and turn over the top card. Ask them to write the number in one of the empty boxes of their place value grid.   |  |  |  | | --- | --- | --- | | Hundreds | Tens | Ones | |  |  |  | |  |  |  |   Ask them to continue turning over cards and writing the number shown in all the boxes until all the boxes are filled. Students then use blocks to subtract their numbers. The person with the lowest number wins. |
| LEARNING SEQUENCEExtension |  |
| **EVALUATION & REFLECTION** | Student engagement: Achievement of outcomes:  Resources: Follow up: |

* All assessment tasks should be written in **red** and planning should be based around developing the skills to complete that task.
* Assessment rubrics or marking scale should be considered.

**MATHEMATICS STAGE 2**

**TEACHING AND LEARNING OVERVIEW**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| TERM: 1 | WEEK: 8 | STRAND:Number and Algebra | **SUB-STRAND:**  **Addition and Subtraction 1** | **WORKING MATHEMATICALLY:**  **MA2-1WM, MA2-2WM, MA2-3WM** |
| OUTCOMES: | | * uses appropriate terminology to describe, and symbols to represent, mathematical ideas MA2-1WM * selects and uses appropriate mental or written strategies, or technology, to solve problems MA2-2WM * checks the accuracy of a statement and explains the reasoning used MA2-3WM * uses mental and written strategies for addition and subtraction involving two-, three-, four- and five-digit numbers MA2-5NA | | |
| **CONTENT:** | | Students:  **Recall addition facts for single-digit numbers and related subtraction facts to develop increasingly efficient mental strategies for computation** (ACMNA055)  add three or more single-digit numbers  apply known single-digit addition and subtraction facts to mental strategies for addition and subtraction of two-, three- and four-digit numbers, including: CCT  the compensation strategy, eg 63 + 29: 63 + 30 = 93, subtract 1 to obtain 92  using patterns to extend number facts, eg 500 – 200: 5 – 2 = 3, so 500 – 200 = 300  bridging the decades, eg 34 + 26: 34 + 6 = 40, 40 + 20 = 60  select, use and record a variety of mental strategies to solve addition and subtraction problems, including word problems, with numbers of up to four digits CCT  give a reasonable estimate for a problem, explain how the estimate was obtained, and check the solution (Communicating, Reasoning) CCT  use concrete materials to model the addition and subtraction of two or more numbers, with and without trading, and record the method used  **Recognise and explain the connection between addition and subtraction** (ACMNA054)  demonstrate how addition and subtraction are inverse operations  explain and check solutions to problems, including by using the inverse operation CCT | | |
| ASSESSMENT FOR LEARNING (PRE-ASSESSMENT) | | Two addends to 50  *How many pairs of numbers can you find that add up to 50?*  Students write their responses on paper. Take note of which students create patterns eg  40 + 10, 41 + 9, 42 + 8, 43 + 7 | | |
| WARM UP / DRILL | | Use a hundred chart to investigate patterns with odd and even numbers, patterns that increase by tens e.g. 7, 17, 27...107, and patterns that decrease e.g. counting backwards by tens.  https://www.det.nsw.edu.au/eppcontent/glossary/app/resource/image/77.png?w=473 | | |
| TENS ACTIVITYNEWMAN’S PROBLEMINVESTIGATION | | I added two numbers together, each with two digits. I got the answer 67, what might the numbers be? | | |
| QUALITY TEACHING ELEMENTS | | **INTELLECTUAL QUALITY** | **QUALITY LEARNING ENVIRONMENT** | **SIGNIFICANCE** |
| * Deep knowledge * Deep understanding * Problematic knowledge * Higher-order thinking * Metalanguage * Substantive communication | * Explicit quality criteria * Engagement * High expectations * Social support * Students’ self-regulation * Student direction | * Background knowledge * Cultural knowledge * Knowledge integration * Inclusivity * Connectedness * Narrative |
| RESOURCES | | Hundred charts, dice, base 10 materials, | | |

**TEACHING AND LEARNING EXPERIENCES**

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| WHOLE CLASS INSTRUCTION MODELLED ACTIVITIES | GUIDED & INDEPENDENT ACTIVITIES | |
| **Whole class activities**  **\*choose and apply efficient strategies for addition and subtraction (Problem Solving) \*discuss and compare different methods of addition and subtraction (Communicating)**  Reinforce addition facts using mental strategies, addition squares and games.  Demonstrate the combinations that make ten using Base 10 blocks. Revise friends of 10 and friends of 20.  Use Base 10 blocks to cover sets of numbers on a hundred chart.  Eg single digits, numbers ending in 5, the number two less than 71, place a short on any number, then the number 5 larger, and so on, to create a pattern.  **Number Sentences**  Look at the number sentence 4 + 3 = 7.  *How would you show this number sentence with blocks?*  *If you had four tens and three tens, how many*  *tens would there be altogether?*  *How would you show this number sentence with blocks?*  This can be written as 40 + 30 = 70.  Look at the number sentence 6 + 3 = 9. Make this with the blocks materials.  *If you had six tens and three tens, how many*  *tens would there be altogether?*  Make this with the blocks materials. This can be written as 60 + 30 = 90 | LEARNING SEQUENCERemediation | Place Value Game:  Students receive a place value chart, roll a dice two times a create a number, then make that number using base 10 materials. When students have made two numbers they add them together using the base 10 materials.  Use a 'think aloud' strategy to explicitly teach students the steps to identify the next number in a pattern. This strategy focuses on the teacher explaining the thinking process while completing a task. The teacher models the thinking process for a subtraction number pattern by talking through these steps.   1. Say: *Look at this pattern. Can you see what has happened to get the next number in the* pattern?   http://www.schools.nsw.edu.au/learning/7-12assessments/naplan/teachstrategies/yr2012/images/nn_paal_02_03.jpg   1. *Are the numbers getting bigger? No. If the numbers are getting smaller, the pattern might be to take away a number. I need to find the difference between two numbers in the pattern.* 2. *Two of the numbers are 46 and 40. The difference is 6. Is the difference between 58 and 52, 6? Yes. The pattern is going down by 6 each time*. |
| LEARNING SEQUENCE | Write your own addition number pattern  using 7, 70, 700 and 7000 as your answers.  \_\_\_\_\_ + \_\_\_\_\_ = 7  \_\_\_\_\_ + \_\_\_\_\_ = 70  \_\_\_\_\_ + \_\_\_\_\_ = 700  \_\_\_\_\_ + \_\_\_\_\_ = 7000  Write your own subtraction number pattern  using 3, 30, 300 and 3000 as your answers.  \_\_\_\_\_ – \_\_\_\_\_ = 3  \_\_\_\_\_ – \_\_\_\_\_ = 30  \_\_\_\_\_ – \_\_\_\_\_ = 300  \_\_\_\_\_ – \_\_\_\_\_ = 3000  Complete the following number sentence patterns.    **Pattern Tables (Addition and Subtraction)**   |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  | **13** | **23** | **33** | **43** | **53** | **63** | **73** | **83** | **93** | | * **4** |  |  |  |  |  |  |  |  |  | | * **6** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  | **22** | **32** | **42** | **52** | **62** | **72** | **82** | **92** | **102** | | **+ 5** |  |  |  |  |  |  |  |  |  | | **+ 3** |  |  |  |  |  |  |  |  |  | |
| LEARNING SEQUENCEExtension | The answers to a pattern of extended number  facts are:  5, 50, 500 and 5000.  *What are the addition and take away number*  *fact patterns with these answers?*  Dice Work  Throw three dice. Subtract the largest number thrown from a two-digit number formed by the other two dice. If the answer is on the grid shown, cover the number, write down the number sentence and continue. The first to complete a line wins. Check the winners number sentence with a calculator.   |  |  |  |  | | --- | --- | --- | --- | | 10 | 37 | 7 | 28 | | 27 | 19 | 30 | 16 | | 9 | 20 | 18 | 39 | | 38 | 8 | 29 | 17 | |
| EVALUATION & REFLECTION | Student engagement: Achievement of outcomes:  Resources: Follow up: |
|

* All assessment tasks should be written in **red** and planning should be based around developing the skills to complete that task.
* Assessment rubrics or marking scale should be considered.

**MATHEMATICS STAGE 2**

**TEACHING AND LEARNING OVERVIEW**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| TERM: 1 | WEEK: 9 | STRAND:Number and Algebra | **SUB-STRAND:**  **Addition and Subtraction 1** | **WORKING MATHEMATICALLY:**  **MA2-1WM, MA2-2WM, MA2-3WM** |
| OUTCOMES: | | * uses appropriate terminology to describe, and symbols to represent, mathematical ideas MA2-1WM * selects and uses appropriate mental or written strategies, or technology, to solve problems MA2-2WM * checks the accuracy of a statement and explains the reasoning used MA2-3WM * uses mental and written strategies for addition and subtraction involving two-, three-, four- and five-digit numbers MA2-5NA | | |
| **CONTENT:** | | Students:  **Recall addition facts for single-digit numbers and related subtraction facts to develop increasingly efficient mental strategies for computation** (ACMNA055)  add three or more single-digit numbers  apply known single-digit addition and subtraction facts to mental strategies for addition and subtraction of two-, three- and four-digit numbers, including: CCT  select, use and record a variety of mental strategies to solve addition and subtraction problems, including word problems, with numbers of up to four digits CCT  give a reasonable estimate for a problem, explain how the estimate was obtained, and check the solution (Communicating, Reasoning) CCT  use concrete materials to model the addition and subtraction of two or more numbers, with and without trading, and record the method used  **Recognise and explain the connection between addition and subtraction** (ACMNA054)  demonstrate how addition and subtraction are inverse operations  explain and check solutions to problems, including by using the inverse operation CCT use the equals sign to record equivalent number sentences involving addition and subtraction and so to mean 'is the same as', rather than to mean to perform an [operation](http://syllabus.bos.nsw.edu.au/glossary/mat/operation/?ajax), eg 32 – 13 = 30 – 11 check given number sentences to determine if they are true or false and explain why,  eg 'Is 39 – 12 = 15 + 11 true? Why or why not?' (Communicating, Reasoning) CCT Represent money values in multiple ways and count the change required for simple transactions to the nearest five cents (ACMNA059) calculate equivalent amounts of money using different denominations, eg 70 cents can be made up of three 20-cent coins and a 10-cent coin, or two 20-cent coins and three 10-cent coins, etc WE | | |
| ASSESSMENT FOR LEARNING (PRE-ASSESSMENT) | | Write several inequalities symbols on the board e.g. > < =, and see if students can create correct number sentences. | | |
| WARM UP / DRILL | | Play **Fancy Dice:** play this game in pairs, player 1 rolls 5 dice. If they roll a 2 or a 5 the dice goes to player 2. All the leftover dice the student adds together. Player one keeps rolling and adding up their score until player 2 has all 5 dice then player 2 has their rolls. The game ends when somebody gets to 100.  Variations: a player loses a turn of they roll two 6’s, a player has to go back to zero if they roll three 6’s | | |
| TENS ACTIVITYNEWMAN’S PROBLEMINVESTIGATION | | **\_\_ +\_\_+\_\_+\_\_= 28**  Show that the addition process can be shown in many different ways and there are always a range of possible answers. | | |
| QUALITY TEACHING ELEMENTS | | **INTELLECTUAL QUALITY** | **QUALITY LEARNING ENVIRONMENT** | **SIGNIFICANCE** |
| * Deep knowledge * Deep understanding * Problematic knowledge * Higher-order thinking * Metalanguage * Substantive communication | * Explicit quality criteria * Engagement * High expectations * Social support * Students’ self-regulation * Student direction | * Background knowledge * Cultural knowledge * Knowledge integration * Inclusivity * Connectedness * Narrative |
| RESOURCES | | Dice, play money, MAB blocks | | |

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| --- | --- | --- |
| WHOLE CLASS INSTRUCTION MODELLED ACTIVITIES | GUIDED & INDEPENDENT ACTIVITIES | |
| **Equivalent Number sentences**  As a whole class write several equations on the board, students have to circle the equations that have the same answer then write them on the board. E.g. 20+12 = 18+14  Revise Jump, Split, compensation and partition strategies.  **Scales**  Draw a picture of scales on the board with an equals sign in the middle. Demonstrate that if you take a number from one side you have to put it onto the other side. An equals sign always needs to be balanced on each side.  **Cyber Squad**  Tell the students that they will now watch three video clips in which the CyberSquad must solve number puzzles, each one more complicated than the last. After viewing a clip, discuss the method used by the CyberSquad to create a balanced equation. Replay the clip if necessary  A simple balance:  <http://www.pbslearningmedia.org/resource/vtl07.math.algebra.equ.simplebala/>  Balancing equations:  <http://www.pbslearningmedia.org/resource/vtl07.math.algebra.equ.balanequat/>  Equation with a missing value:  <http://www.pbslearningmedia.org/resource/vtl07.math.algebra.equ.solvingequ/>  **Trading Coins for Equivalent Values**  Draw a $1 coin on the board and ask: *How can represent this amount with 10c or 20c coins? How many different ways do you think we can do it? Encourage the students to describe how they could trade two 10c coins for one 20c coin to a create a new representation.*  Continue the discussion, asking the students how they could show $1 using 10c, 20c and/or 50c coins. Bring out the ways that 20c and 10c coins can be traded for a 50c coin.  Draw a $2 coin on the board and ask the students to work with a partner to find at least four different ways to show this amount using different coin combinations. | LEARNING SEQUENCERemediation | **Play Money**  Practice equalities using play money. Students use the concrete materials to show  For example 20c + 20c + 20c = 50c + 10c  **Equal Diagrams**  Using MAB blocks students create equal diagrams e.g. 3 tens = 30 units |
| LEARNING SEQUENCE | **Recording equivalent number sentences**  Students are given a pack of cards with digits 0-9 and operation cards of - + =. Students create 2 two, three or four digit numbers. They then select a operations card and perform the operation. Students then need to record equivalent number sentences ensuring the = is used to show this.  use the equals sign to record equivalent number sentences involving addition and  subtraction and so to mean 'is the same as', rather than to mean to perform an operation,  eg 32 – 13 = 30 – 11  . check given number sentences to determine if they are true or false and explain why,  eg 'Is 39 – 12 = 15 + 11 true? Why or why not?  *Variation: Students can record their original number sentence and swap with other groups for them to complete.*   * Students have to categorise a list of number sentences into a group that has the same answer. * Write a list of number sentences on the board e.g. 12 +8 = 10 + 10.   Students tick which ones are right and have to correct the ones that are wrong   * Solving equations with missing values hand out: <http://www.pbslearningmedia.org/asset/vtl07_doc_h1balance/>   In pairs students complete the problem solving questions <http://alearningplace.com.au/wp-content/uploads/2014/08/ADD-SUB-23-PA-18-Miss-Equiv-Add-Sub-INVESTIGATE.pdf> Assessment  **Two to 50:**  Ask students: *How many pairs of numbers can you find that equal 50?*  Students record their answers as equivalent number sentences  Eg 2 + 48 = 4 + 46, 60 – 10 = 56 – 6  Repeat activity with other base numbers (encourage students to use both addition and subtraction).  **Investigations:**  If you roll a standard die for each of the missing numbers in the equation below, how many different ways can you complete it so it is true?  \_\_\_\_ + \_\_\_\_ = \_\_\_\_ + \_\_\_\_  Think:  *What looks different or interesting about this equation?*  *How will we know when this equation is true?*  *What are numbers are we able to roll on a standard die?*  *What is an example of one way to make this equation true?*  **Coin Challenge**  Give small groups a collection of coins. Then have students come up with different way to make 20c, 50c, 85c or other amounts up to $1. Have them write down or draw their collections. Then challenge them with questions such as, “*What three coins can you use to make 75c?”* or *“Whats the fewest number of coins you can use to make 40c?”* Allow groups to use their coins to come up with their answers. |
| LEARNING SEQUENCEExtension | * Do the same problem solving questions <http://alearningplace.com.au/wp-content/uploads/2014/08/ADD-SUB-23-PA-18-Miss-Equiv-Add-Sub-INVESTIGATE.pdf>   But replace whole numbers with fractions and decimals   * Have students write word problems to match the questions they have answered * Students start using multiplication and division in their number sentences * Students use all 4 operations in a matching number sentence |
| **EVALUATION & REFLECTION** | Student engagement: Achievement of outcomes:  Resources: Follow up: |

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