

***NELSON MATHS: AUSTRALIAN CURRICULUM
BUILDING MENTAL STRATEGIES SKILL BOOK 5
TEACHER SUPPORT NOTES***

CONTENTS

Counting Strategies

UNIT 1: NUMBER PATTERNS3
UNIT 2: COUNTING WITH DECIMALS.....4
UNIT 3: COUNTING WITH FRACTIONS.....5

Place-value Strategies

UNIT 4: ORDERING 6-DIGIT NUMBERS6
UNIT 5: EXPANDING NUMBERS.....7
UNIT 6: LESS THAN AND GREATER THAN.....8
UNIT 7: DECIMALS (THOUSANDTHS).....9
UNIT 8: NEGATIVE NUMBERS10

Addition Strategies

UNIT 9: NEAR DOUBLES.....11
UNIT 10: ‘SPLIT’ STRATEGY12
UNIT 11: ‘COMPENSATION’ STRATEGY (ADDITION)13
UNIT 12: ‘JUMP’ STRATEGY (ADDITION).....14
UNIT 13: ADDITION WITH TRADING.....15
UNIT 14: FRACTION ADDITION.....16
UNIT 15: DECIMAL ADDITION.....19

Subtraction Strategies

UNIT 16: ‘JUMP’ STRATEGY (SUBTRACTION).....20
UNIT 17: ‘COMPENSATION’ STRATEGY (SUBTRACTION).....22
UNIT 18: NUMBER LINES23
UNIT 19: ‘COUNTING UP TO’ STRATEGY24
UNIT 20: FRACTION SUBTRACTION.....25
UNIT 21: DECIMAL SUBTRACTION27

<i>Addition and Subtraction Strategies</i>	
UNIT 22: ADDITION AND SUBTRACTION	28
<i>Multiplication Strategies</i>	
UNIT 23: MULTIPLICATION BY 9.....	29
UNIT 24: MULTIPLICATION BY 7.....	30
UNIT 25: DOUBLES	31
UNIT 26: MULTIPLICATION BY 10	32
UNIT 27: MULTIPLICATION BY 20	35
UNIT 28: MULTIPLICATION BY 100	38
UNIT 29: MULTIPLICATION BY 50	40
UNIT 30: MULTIPLICATION OF DECIMALS.....	43
<i>Division Strategies</i>	
UNIT 31: DIVISION BY 5S AND 10S.....	44
UNIT 32: DIVISION BY 2S, 4S AND 8S.....	45
UNIT 33: DIVISION WITH ZEROS	46
UNIT 34: DECIMAL DIVISION.....	48

Unit 1

Number Patterns

Teacher Support Notes

Recommended introductory lesson to *Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5*, pp. 4–5

Teaching Focus: to continue number patterns, explain number patterns, and predict how a number pattern will continue based on an understanding of how the pattern works.

You will need: toothpicks, calculators, coloured beads on a string, pieces of card

- Provide students with a number of toothpicks. Have students make a square with the toothpicks. Have students create a second square, adding another square, and so on, so that they have the first 5 sets of the pattern.
- Ask students to describe or write a rule that describes the pattern of squares by connecting the position number to the number of toothpicks. Have students share their rules and test them out. Ask, ‘Can you predict the number of toothpicks for any position of this pattern?’ Try a number of different student rules.

Have students complete *Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5*, pp. 4–5.

Assessment Task/s

- Show students a specific pattern of coloured beads on a string. Ask students to verbalise a rule that describes the pattern. Ask students whether the rule can be stated differently.
- Have students record the pattern and the rule of the coloured beads.

Recommendations

- Have students who are experiencing difficulty work in a teacher focus group using a calculator to support their calculations. Provide students with a selection of number patterns. Show students how to work backwards, i.e. use the second number and then the first to determine the rule, and then check with the third and second numbers. Repeat a number of times.
- For students who have a sound understanding of patterns, rules can be extended to include two steps. For example: start at 100, divide by 2 and add 10. Alternatively, more complex patterns can be provided for students to determine the rule.
- For practice, have students create their own number patterns to share with other students. Students can record the patterns on one side of a piece of card and the rules on the other side.

Unit 2

Counting with Decimals

Teacher Support Notes

Recommended introductory lesson to *Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5*, pp. 6–7

Teaching Focus: to continue number patterns, explain number patterns, and predict how a number pattern will continue based on an understanding of how the pattern works.

You will need: cards with a decimal counting pattern, e.g. 1.23, 1.25, 1.27, 1.29, 1.31, 1.33, a bag, calculators

- Place the number cards in a bag. Select the same number of students for the number of cards in the bag. Have students choose a card and display it to the class.
- Ask the students to order the cards in the correct sequence, i.e. smallest to largest. Ask, ‘What is the counting pattern of the number cards?’ Attach the cards to the board and have students help add the next 5 terms of the counting pattern. This activity can be repeated.
- This activity can be extended by using a set of cards that includes one card that does not fit the pattern. Students need to identify which card does not belong and why.

Have students complete Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5, pp. 6–7.

Assessment Task/s

- Provide students with a set of decimal cards and have them correctly order the cards. Ask students to identify the counting pattern.
- Have students record the pattern and the rule of the decimal cards.

Recommendations

- Have students who are experiencing difficulty work in a teacher focus group using a calculator to support their calculations. Provide students with a set of cards with a decimal counting pattern. Have students order the cards from smallest to largest. Show students how to work backwards, i.e. use the second number and then the first to determine the counting pattern, and then check with the third and second numbers and so on. To further simplify the activity, scaffold by starting with whole number counting patterns and then move to decimals or just have students order decimal numbers correctly.
- For students who have a sound understanding of counting with decimals, include larger numbers and decimals to three decimal places as well as more complicated counting patterns.
- To apply these ideas students can investigate the exchange rates between Australia and other countries, e.g. Australia and America, by researching on the Internet. Students can then create a table showing the cost of their favourite items in Australia compared the cost of the same items in the other country.

Unit 3

Counting with Fractions

Teacher Support Notes

Recommended introductory lesson to *Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5*, pp. 8–9

Teaching Focus: to order common fractions from smallest to largest, and identify common fractions that are larger than/smaller than another common fraction.

You will need: lengths of string, blank number line, fraction cards

- Provide groups of students with a length of string. Ask, ‘If the string is a number line from 0–1, what fractions can you represent on your length of string?’ Provide students with time to investigate. Have students draw and share their number lines on the whiteboard. Look at similarities and differences. Note: students should be encouraged to fold the string to create the divisions.
- Repeat the activity, but with the string representing a number line from 0–2.
- This activity can be extended with number line starting at 1 and extending to 5, etc.

Have students complete *Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5*, pp. 8–9.

Assessment Task

- Provide the student with a blank number line. Have the student record a counting pattern, e.g. eighths, on the number line.

Recommendations

- For students experiencing difficulty, cut up (or create) fraction cards and have them work in a teacher focus group with students identifying the larger fraction of pairs. Then move students on ordering sets of fraction cards, i.e. 3–4 similar fractions, from smallest to largest. For students who have a sound understanding of counting with fractions, introduce counting patterns using equivalent fractions such as thirds, sixths and ninths.
- To practise quick identification of fractions cut up (or create) fraction cards, and have students play a game where each player lays out a card and the student who has the card of highest value wins the pair. Note: use appropriate cards for the students’ ability levels.

Unit 4

Ordering 6-digit Numbers

Teacher Support Notes

Recommended introductory lesson to *Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5*, pp. 10–11

Teaching Focus: to put whole numbers in order from smallest to largest, continue number patterns and predict how a number pattern will continue based on an understanding of how the pattern works.

You will need: at least 2 different coloured standard dice, pieces of card, number cards, 10-sided dice

- Roll two different coloured standard dice four times and record the numbers on the whiteboard.

	Yellow die	Red die
Numbers rolled	4, 3, 6, 1	2, 4, 3, 5
Largest number	6431	5432
Numbers rolled		
Largest number		

Have students use the digits to create the largest number for each of the set of numbers for the different coloured die.

- Have students identify which of the two created numbers is the largest by circling it. Repeat the activity, creating 5-digit and 6-digit numbers.

Have students complete Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5, pp. 10–11.

Assessment Task

- Provide the student with a set of number cards. Have the student create 3 different 4-digit numbers with the cards and record these numbers. Then have the student order the numbers from smallest to largest.

Recommendations

- Have students who are experiencing difficulty work in a teacher focus group. Students roll a die four times and create the largest number possible with the digits, and then the smallest number possible. Have students write the numbers on pieces of card and then compare them to work out which one is larger.
- For students who have a sound understanding of ordering numbers, extend the dice activity to 7-digit numbers. Students can also generate more than three numbers to order and compare.
- For practice, use a 10-sided die with digits 0–9 for generating and ordering numbers. Students can also work in small groups to create a 6-digit number each, and record it on a piece of card. Then the group can order all of these generated numbers.

Unit 5

Expanding Numbers

Teacher Support Notes

Recommended introductory lesson to *Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5*, pp. 12–3

Teaching Focus: to explain the value of a numeral according to its place in a number.

You will need: number cards, modelling equipment such as MAB, cards with expanded 6-digit numbers, blank pieces of card, digital camera (if available), newspapers

- Create number cards with up to four digits. Provide students with a card and ask them to model that number in the simplest form with equipment such as MAB, i.e. a single = 1, a long = 10, a flat = 100 and a block = 1000.
- Have students record what they modelled, e.g. $2461 = 2000 + 400 + 60 + 1$. Repeat the activity a number of times, with students recording the numeral and its expanded form. It might be appropriate for students to sketch a diagram.
- The activity can be extended by looking at 5- and 6-digit numbers.

Have students complete Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5, pp. 12–13.

Assessment Task/s

- Provide students with a 6-digit number and ask them to model it with the modelling equipment and record the number both as a numeral and in expanded form.
- Now, provide students with a model and ask them to record the expanded form and determine the numeral that the model represents.

Recommendations

- Have students who are experiencing difficulty work in a teacher focus group with students using the modelling equipment to model different numbers. Begin with the numbers already in expanded form and have students model these first, e.g. $200 + 40 + 6$. Then move to written 2-digit numbers, e.g. 95, and then to larger numbers. Have students look for the simplest forms, e.g. $25 = 2 \text{ longs} + 5 \text{ singles}$ rather than 25 singles. Have students record the numeral, the expanded form and, if appropriate, a diagram. It might be possible to take a digital photo of the models and have students attach it with their work if a digital camera is available.
- For students who have a sound understanding of expanding numbers, provide them with number cards with the numerals in expanded form but mixed up, e.g. $200 + 4000 + 6 + 30$. Have students model the number and then record the expanded form and the final numeral.
- For practice, students can use the newspaper or a similar source to find different numbers. They can record the numbers on one side of a piece of card and then write the expanded form on the other side. To extend the activity, students can then swap the expanded form with a partner and the partner can determine the number (using the number on the back of the card to check their answer).

Unit 6

Less Than and Greater Than

Teacher Support Notes

Recommended introductory lesson to *Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5*, pp. 14–15

Teaching Focus: to identify less than (<) and greater than (>) signs and use them correctly.

You will need: playing cards with picture cards removed, picture of less than and greater than signs (as mouth of crocodile, see *Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5*, p. 14), cards with < and > signs, 100 chart, decimal cards, fraction cards, positive and negative numbers

- In pairs, have students divide the playing cards (with the picture cards removed). From their own pile, students place two cards in front of them to create a 2-digit number. The player with the largest number wins and collects the four cards. Play continues until one player has no cards. The game can be varied with students playing for the smallest number.
- After a number of games, show students the pictures of less than and greater than signs (as mouth of crocodile, see *Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5*, p. 14) reminding students that the crocodile likes to eat the most. Display the picture on the board.
- Repeat the game with students recording the pairs as a list with the less than/greater than signs. Students can then check the winner against their written recordings.

Have students complete Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5, pp. 14–15.

Assessment Task/s

Provide students with two 4-digit numbers on cards, and a less than and greater than symbol. Have students arrange the cards to display a correct statement. Have students record their statement.

- To extend, provide students with pairs of decimal cards or fraction cards, and a less than and greater than symbol. Have students arrange the cards to display and then record a correct statement.

Recommendations

- Have students who are experiencing difficulty work in a teacher focus group using sets of cards from a cut up 100 chart and less than and greater than signs to create correct number sentences. Begin the activity with smaller, more familiar numbers and work through to the larger numbers. Have students record the number sentences.
- For students who have a sound understanding of less than and greater than, extend the activity by providing them with number and symbols cards and have them create equations with the < and > cards to make correct less than and greater than statements. Have students record their statements to share.

Unit 7

Decimals (Thousandths)

Teacher Support Notes

Recommended introductory lesson to *Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5*, pp. 16–17

Teaching Focus: to order decimals from smallest to largest and convert between decimals and fractions.

You will need: length of string, decimal cards (between 0 and 10, up to 3 decimal places), pegs, bag, fraction cards (showing fractions with denominators of 10, 100 or 1000), blank number line, newspapers

- Place the decimal cards in a bag and tie the string up against the board to create a number line. Invite students, one at a time, to select a decimal card and peg it on the string in the appropriate place.
- Repeat the process asking students to justify their card placements, i.e. ‘Why did you place your card there?’ Allow students to rearrange the cards if required.
- The activity can be extended by including some fraction cards showing fractions with denominators of 10, 100 and 1000.

Have students complete Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5, pp. 16–17.

Assessment Task/s

- Provide students with four different decimal cards and ask them to correctly order and record the cards from smallest to largest on a blank number line.
- To extend, provide students with cards with the same whole number and different decimals. Have students order the cards from smallest to largest and ask questions such as, ‘Why did you place the card in this position?’

Recommendations

- Have students experiencing difficulty work in a teacher focus group with students using pairs of decimal cards to identify which card is largest. Have students work through a number of examples, creating two piles of cards – one with larger decimals, and the other with smaller decimals.
- For students who have a sound understanding of ordering decimals, extend the activity to include larger numbers and have students order the cards correctly from largest to smallest. Then students can record the order on a number line. Students can also practise converting the ordered decimals into fractions.
- For practice, students can use the newspaper (or a similar resource) to find decimal numbers. They can record a set of 10 decimal numbers and then order them from smallest to largest.

Unit 8

Negative Numbers

Teacher Support Notes

Recommended introductory lesson to *Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5*, pp. 18–19

Teaching Focus: to place negative and positive numbers on a number line and continue counting patterns with positive and negative numbers.

You will need: calculator for OHP, calculators, blank number line, positive and negative number cards, positive numbers greater than 10 and negative numbers less than -10 cards

- Enter into the OHP calculator $10 - 2$. Ask students, ‘What would happen if I press the = button 10 times?’ Discuss responses and record predictions.
- Have students enter the equation and press the equals sign on their own calculators and record their findings at each step on the whiteboard, e.g. 10, 8, 6, 4 ... Introduce the concept of negative numbers, represented with the negative sign.
- Ask students, ‘What is another way we can display the numbers?’ Draw out a number line and transfer the collected numbers onto the number line. Examine the position of zero and the symmetry of the negative and positive numbers.
- Repeat the activity with larger numbers, e.g. $500 - 100$, etc.

Have students complete *Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5*, pp. 18–19.

Assessment Task/s

- Provide students with a blank number line, and some positive and negative number cards. Have students correctly order and record the number cards on the number line.
- To extend, provide students with cards with positive numbers greater than 10 and negative numbers less than -10 and have students order and record them.

Recommendations

- Have students who are experiencing difficulty work in a teacher focus group using pairs of positive and negative number cards to identify which card is positive and which is negative. Have the students work through a number of examples, sorting the cards into two piles – positive and negative. Students can then order each pile of cards from smallest to largest.
- For students who have a sound understanding of negative numbers, provide them with different counting patterns, e.g. start at 500 and count backwards by 100 ten times. Have students record their answers.
- For practice, students can create their own number line between 100 and 1000 for future reference. Students can also create number patterns based on the number line to share with a partner.

Unit 9

Near Doubles

Teacher Support Notes

Recommended introductory lesson to *Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5*, pp. 20–21

Teaching Focus: to use mental processes and written methods to add numbers.

You will need: 100 chart, calculators

- Write a list of numbers on the board such as 10, 20, 16, 50, 100, 120 and ask, ‘Can you tell me two numbers that would add up to 10?’ Record students’ responses and work your way down the list. Then circle all the pairs that are doubles and ask students, ‘What is common about all these pairs?’
- Create a new list of pairs of numbers that are near doubles, e.g. 11 and 9, 19 and 21, 49 and 52. Ask students, ‘What might be a shortcut for adding these numbers?’ Make the link back to the doubles, establishing the method of addition.
- Extend the activity by providing students with a number list and having them create their own pairs of near doubles.

Have students complete *Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5*, pp. 20–21.

Assessment Task/s

- Provide students with pairs of near doubles. Have them calculate and record the addition answers.
- Select one of the questions and ask students to explain how they got the answer. Have students record each of the ‘steps’ or thinking processes they went through.
- To extend, have students create a question that would require near doubles to solve.

Recommendations

- Have students who are experiencing difficulty work in a teacher focus group. Provide the students with a selection of numbers (according to ability) from a cut up 100 chart and have students record the number and its double, e.g. $13 + 13 = 26$. Still struggling students can use a calculator for extra support.
- For students who have a sound understanding of near doubles, extend the activity with more complex equations, i.e. with 5- and 6-digit numbers or more than 3 addends.
- For practice, provide students with random numbers from a cut up 100 chart and ask them to find two near doubles to add to that number, e.g. $46 = 22 + 24$. Note: leave in odd numbers to make the activity more challenging.

Unit 10

'Split' Strategy

Teacher Support Notes

Recommended introductory lesson to *Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5*, pp. 22–23

Teaching Focus: to use mental processes and written methods to add numbers.

You will need: many pieces of scrap card

- Provide students with 10 pieces of card. Write the numbers 321 and 435 on the board. Ask students to expand each of the numbers writing each of the components on a different piece of card (see Unit 5).



- Have students group numbers of the same place value together, i.e. all the ones, all the tens and so on. Have students add the groups together and write their totals on another piece of card.
- With the totals have the students 'recombine' the number from expanded form and write their final answer on the last piece of card.
- Have students lay the cards out in equation format, modelling the process as in the *Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5*, pp. 22–23.
- Repeat the process with different numbers, and larger numbers.

Have students complete *Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5*, pp. 22–23.

Assessment Task

- Provide students with a set of cards with thousands, hundreds, tens, etc. Ask students to create an equation with the cards and solve it (provide blank cards for students to use, if required). Have students record the question, their working and answers.

Recommendations

- Have students experiencing difficulty work in a teacher focus group and practise expanding numbers by writing them on separate pieces of card. After about 5 different numbers have been expanded, have the students sort their cards into piles of ones, tens, hundreds, etc.
- For students who have a sound understanding of using the 'split' strategy, extend the process by introducing three numbers into the equations. Support students as they expand the numbers onto the cards, sort them to add and then solve. Have students record the question, the expanded numbers and the solution.
- For practice, students can be provided with one number that is already expanded and one that is not. Students can expand the second number, add and then solve by their preferred method, e.g. cards, pen or paper, etc.

Unit 11

‘Compensation’ Strategy (Addition)

Teacher Support Notes

Recommended introductory lesson to *Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5*, pp. 24–25

Teaching Focus: to use mental processes and written methods to add numbers.

You will need: pieces of scrap card, modelling equipment such as MAB

- Present students with a collection of numbers, e.g. 48, 32, 71 ... and ask, ‘How can these numbers be rewritten to make them a multiple of 10 and ones?’ For example: $48 = 50 - 2$. Collect answers on the whiteboard.
- Have students write each component on a piece of card.
- Now present students with an equation such as $28 + 41 =$.
Have students rewrite one or both the numbers as multiples of tens and ones on pieces of card. Have students move the cards to group tens and ones together (modelling the process as in the *Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5*, pp. 24–25) and then complete the addition.
- Repeat the process with different numbers, and larger numbers.

Have students complete *Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5*, pp. 24–25.

Assessment Task

- Provide student with a set of cards with thousands, hundreds, tens, etc. Provide students with an equation and ask them to use the cards to calculate the equation. Have students record the initial equation, their model and the answer.

Recommendations

- Have students experiencing difficulty work in a teacher focus group. Using modelling equipment such as MAB, have students use the blocks to break down the numbers into multiples of tens and ones. Have students regroup the modelling equipment and calculate answers. This can then be extended to hundreds and then thousands.
- For students who have a sound understanding of using the ‘compensation’ strategy, extend the process by introducing three numbers into the equations. Support students as they expand the numbers onto the cards, sort them to add and then solve.
- For practice, students can be provided with one number selected as the one to be rewritten and one that is not. Students can rewrite the second number, add and then solve by their preferred method, e.g. cards, pen or paper, etc.

Unit 12

‘Jump’ Strategy (Addition)

Teacher Support Notes

Recommended introductory lesson to *Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5*, pp. 26–27

Teaching Focus: to use mental processes and written methods to add numbers.

You will need: blank number line, 100 chart

- Create large number cards based on a 100 chart. These should be large enough for students to step on, and have a single number on each card. (A recommendation would be to laminate these cards.)
- Lay the cards out evenly in order in a large space such as the school hall or outside.
- Present students with an equation such as $26 + 18 =$. Have students model the equation on the number by starting at the larger number and then jumping in groups of tens and then ones. This can be made more visual by having one student stand on the starting number (26) then placing another student at 36, and different students at each of the single jumps 37, 38, ... 44.
- Repeat the process with different numbers and different students. Ask, ‘How can we represent larger numbers, e.g. $152 + 79$?’
- Extend, with students transferring the information onto a number line.

Have students complete Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5, pp. 26–27.

Assessment Task/s

- Provide students with a blank number line and an equation. Ask them to complete the number line and then represent the equation as a series of jumps.
- Provide students with a different equation, and ask them to record their calculation of the answer using the jump strategy and their preferred method, e.g. number line, number squares or calculation.
-

Recommendations

- Have students experiencing difficulty work in a teacher focus group and continue to work on the number squares. Provide students with equations and have each student work out the whole equation, using their body for the jumping. Students can then use number lines in the same way, calculating the equations using a counter or ‘teddy’ in the jumping process. Have students mark their jumps and answers in a different colour on the number line.
- For students who have a sound understanding of using the ‘jump’ strategy, extend the process by introducing three numbers into the equations. Support students by providing blank number lines for calculations.
- For practice, students can be provided with blank number lines and invited to create a series of jumps in a colour and swap their number lines for a partner to write the matching equation. This can be repeated with a different colour and so on.

Unit 13

Addition with Trading

Teacher Support Notes

Recommended introductory lesson to *Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5*, pp. 28–29

Teaching Focus: to use mental processes and written methods to add numbers.

You will need: 100 chart

- Create number cards up to 50 using a cut up 100 chart. Have students work in pairs to play a game of Memory. This is where all the cards are laid out on the table, face down, and students take turns turning the cards over. In this case students are looking for compatible numbers that add to 50.
- As students collect pairs have them record the compatible numbers.
- Allow students to play for a set period of time and then collect the compatible pairs on the whiteboard.
- Now ask, ‘What are compatible numbers that add to 10?’ Collect students’ responses on the whiteboard. Try to draw out pairs and combinations of more than two numbers.
- The activity can be extended with students working with the whole numbers chart and collecting compatible numbers that add to 100.

Have students complete Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5, pp. 28–29.

Assessment Task/s

- Provide students with 3 number cards, e.g. 47, 22 and 13. Ask students to determine the compatible numbers for each of the cards to 100, e.g. $47 + 53 = 100$.
- Now ask students to add the numbers using compatible numbers by their preferred method. Have students record the equation and their working as well as the answer.

Recommendations

- Have students who are experiencing difficulty work in a teacher focus group, and have them work with number cards 1–10 looking for compatible pairs. This activity can be extended to 50 and 100. Have students record their pairs.
- For students who have a sound understanding of the addition process, extend the activity by providing them with two 3-digit numbers and having them find a third compatible number to 1000. Repeat a number of times. This can be extended to include either four numbers or larger numbers again.
- For practice, provide students with the number cards of 1–100 and play a game in groups of three. Each student receives five cards. Students look at their cards and they can use a maximum of four cards to total 100. If they have 100, they place the cards face up on the table and collect enough cards to always have five in their hand. If a player cannot make 100 they pick up a card. Play continues around the table, with each player taking turns. The game ends when no more sets of 100 can be made and the winner is the person with most sets of 100.

Unit 14

Fraction Addition

Teacher Support Notes

Recommended introductory lesson to *Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5*, pp. 30–31

Teaching Focus: to add common fractions, simplify fractions and give fractions common denominators.

You will need: fraction pieces

- Create multiple copies of fraction pieces, e.g. thirds. Pose a question such as $\frac{2}{3} + \frac{2}{3} =$.
- Have students model the addition by grouping $\frac{2}{3}$ and $\frac{2}{3}$ of the fraction pieces then moving $\frac{1}{3}$ to make the one whole and counting the remainder ($\frac{1}{3}$) to find the answer of $1 \frac{1}{3}$ (this is essentially modelling the addition process of *Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5*, p. 30). Have students record the process by gluing the pieces in a step-by-step format on paper or by drawing.
- Pose other addition questions that result in an answer greater than 1 and have students model with the fraction pieces, using both the circle fractions and the rectangle fractions.

Have students complete Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5, pp. 30–31.

Assessment Task/s

- Provide students with a number of pieces from a circle cut into eighths in two piles, e.g. $\frac{7}{8}$ and $\frac{6}{8}$. Have students work out what the addition equation is and the answer. Have students record the equation, any working and the answer.
- This task can be extended by providing two piles of pieces that total more than 2 wholes.

Recommendations

- Have students experiencing difficulty work in a teacher focus group. Provide students with fraction pieces. Have students reassemble the pieces into whole circles (with equal parts) identifying halves, quarters, etc. When students are ready, provide them with a small number of parts of a whole, e.g. $\frac{2}{6}$, and ask them to work out how many more pieces they would need to make a whole. Then allow students to find the pieces and complete. Have students record what they did.
- For students who have a sound understanding of the addition of fractions, extend the activity to include three or more fractions with equal denominators and have students model with the circles or rectangles.
- For practice, have students work with equations that have fractions of different denominators. Have students model with the circles or rectangles, exchanging parts for equivalent fractions and complete the additions as before. Students can present their work by gluing it onto a poster/card for display.

Unit 15

Decimal Addition

Teacher Support Notes

Recommended introductory lesson to *Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5*, pp. 32–33

Teaching Focus: to use mental and written methods to add decimal numbers.

You will need: a blank place-value chart, calculators

- Provide students with a place-value chart with columns that include decimals. For example:

Tens	Ones	.	Tenths	Hundredths	Thousandths

- Have students enter in decimal numbers such as 3.21, 14.079, etc., and check that they are entering the correct digits into the correct columns, showing the correct entry on an enlarged copy on the whiteboard.
- Discuss with students how we can use the chart for an addition equation, for example $1.4 + 2.3$. Have students try on the chart and share ideas and comments. Invite students to share on the enlarged chart.
- Discuss how the chart can be used to add decimals such as $10.073 + 2.4$. Again have students attempt on the chart and invite them to share ideas. Ask students to try the addition equation by working left to right (i.e. entering numbers in the wrong columns) and to share what they discovered. Have students investigate why the place-value columns are important by trying methods that don't work. Hint: have students rule off in red after each calculation, so they can clearly define their work.

Have students complete Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5, pp. 32–33.

Assessment Task/s

- Provide students with an equation and a place-value chart. Ask them to complete the addition using their preferred method.
- Using the place-value chart, have students explain the importance of the decimal place and alignment by showing their own example.

Recommendations

- Have students experiencing difficulty work in a teacher focus group. Provide students with a range of decimal numbers and have them enter it onto the place-value chart. To begin the addition process, provide students with a chart that is the same size as the number of decimal places, i.e. with two decimal places the chart should only extend to hundredths. Have students work through a number of simple calculations where the number of decimal places are equal. Have students check answers with a calculator.

- For students who have a sound understanding of the addition of decimals, extend the activity to include three or more decimals to add. This can be done by students' preferred method. Note: stress the importance of the lining up of the decimal place.
- For practice, provide students with a range of decimal numbers (e.g. 2.16, 4.09, 13.25) and have them determine the amount to make the next whole number, i.e. $2.16 + 0.84 = 3$. Answers can be checked with a calculator.

Unit 16

'Jump' Strategy (Subtraction)

Teacher Support Notes

Recommended introductory lesson to *Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5*, pp. 34–35

Teaching Focus: to use mental processes and written methods to subtract numbers.

You will need: calculators, pieces of card, catalogues

- Provide students with a subtraction equation such as $46 - 29$. Ask students to expand the second number, i.e. $20 + 9$ (see Unit 5). On a calculator have the students enter the first number of the equation, i.e. 46, then subtract the 20 = 26, and then subtract the 9, so $26 - 9 = 17$.
- Have students record the steps and the answers they view on the calculator. Students can record what they press on the calculator keys as a number or operation with a box around it.

For example:

46	-	20	=	26
26	-	9	=	17

So $46 - 29 = 17$

- Have students try a number of equations, recording their steps as they proceed.
- After a number of examples examine the layout of the information and note facts such as all of the numbers in the second column add to the expanded number.

$$46 - 20 = 26$$

$$26 - 9 = 17$$

$$29 \quad \text{i.e. } 46 - 29 = 17$$

- The activity can be extended by having students work with larger numbers.

Have students complete Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5, pp. 34–35.

Assessment Task/s

- Provide students with a number of pieces of card. Have an equation written on one piece. Ask students to expand the second number by writing each component on a separate piece of card. Then have students model the subtraction process on the remaining pieces of card using their preferred method.
- Ask, 'Is it important which number is written first and which number is expanded? And why?'

Recommendations

- Have students experiencing difficulty work in a teacher focus group. Have students write each key step of the calculator on a different piece of card, e.g. '45' would be on one piece and '-' on another and so on. Then have the students write the calculator views in another colour on different pieces of card, to complete the equations. Have students lay out the cards in correct order. Cards can be moved around to highlight layout. These can then be glued onto a sheet. Repeat with a number of equations.
- For students who have a sound understanding of the 'jump' strategy for subtraction, introduce larger numbers with students again recording the key strokes of the calculator.
- For practice, have students find a range of whole number money amounts, e.g. \$125, from catalogues, etc. and ask them to subtract from a common amount, e.g. \$180, using the jump strategy. Students can use calculators if required.

Unit 17

‘Compensation’ Strategy (Subtraction)

Teacher Support Notes

Recommended introductory lesson to *Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5*, pp. 36–37

Teaching Focus: to use mental processes and written method, and calculators to subtract numbers.

You will need: pieces of card, calculators, 100 chart

- Provide students with pieces of card. Pose a subtraction problem such as: $57 - 28$. Have students write each part of the equation on a separate piece of card. Next have students round the second number to the nearest multiple of 10, e.g. $28 = 30 + 2$, and again have students write each part of the equation on a piece of card. Have students complete the calculation, laying the cards out to model the subtraction method of *Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5*, p. 36.
- Repeat the activity with an equation where students round down to the nearest multiple of 10, e.g. $53 - 41$.
- Ask students, ‘Why, when we round up, is the difference added to the equation?’ and ‘Why, when we round down, is the difference subtracted from the equation?’
- Have students repeat and explore more equations.

Have students complete Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5, pp. 36–37.

Assessment Task

- Provide students with an equation with the compensation steps laid out (see *Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5*, p. 36), but with numbers missing. Have students suggest what numbers need to be inserted into the spaces and why. Have students record the steps and their answers.

Recommendations

- Have students experiencing difficulty work in a teacher focus group. Provide students with numbers that are close to a ‘ten’, e.g. 41, 58, 92, etc. Have students write cards that show the rounding up/rounding down to the nearest multiple of 10.
- For students who have a sound understanding of the ‘compensation’ strategy for subtraction, larger numbers can be introduced. Students can check their answers using a calculator.
- To practise the rounding process, provide students with rounding cards, e.g. +2, +1, -1, -2, etc. In pairs, have students play a game with a pile of number cards (a cut up 100 chart can be used). Students take turns turning a card over. Then it is a ‘race’ to see who can find the correct rounding card in their hand. The fastest collects the centre card.

Unit 18

Number Lines

Teacher Support Notes

Recommended introductory lesson to *Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5*, pp. 38–39

Teaching Focus: to use mental processes and written methods to subtract numbers.

You will need: laminated blank number lines, counters/teddies, coloured whiteboard markers, calculators, chalk/masking tape

- Provide students with laminated blank number lines, one between two). Next provide them with a range e.g. 0 to 80. Have the students work together to divide the number line into the correct divisions using whiteboard markers.
- Now present the students with an equation such as $75 - 28$. Have students expand the second number, i.e. $28 = 20 + 8$. Have students use counters/teddies to start at 75, and then complete the jumps with the counter. Have students record the jumps on the number line with the whiteboard markers.
- Ask students to investigate what other jumps can be performed, e.g. $28 = 10 + 10 + 8$, and have them record these on the number line in different colours. Invite students to share their findings.
- Have students explore more equations.

Have students complete Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5, pp. 38–39.

Assessment Task/s

- Provide students with blank number line. Pose an equation such as $125 - 58$. Have students divide the number line and then show two different ways they can use the number line to solve the equation.
- Have students record the steps and their answers numerically.

Recommendations

- Have students experiencing difficulty work in a teacher focus group. Create a large number line on the floor with chalk or masking tape and have students modelling the equations by moving down the number line. Have the other students in the group recording the ‘steps’ numerically. Work with numbers below 100 and then move to 0–200.
- For students who have a sound understanding of the ‘jump’ strategy for subtraction, have them show more than one answer for each of their number lines using different colours.
- For practice, have students use the laminated number lines to create their own equations (similar to *Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5*, pp. 39) and swap with a partner to write and solve the equations. Have students check their answers using a calculator.

Unit 19

‘Counting Up To’ Strategy

Teacher Support Notes

Recommended introductory lesson to *Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5*, pp. 40–41

Teaching Focus: to use mental processes and written methods to subtract numbers.

You will need: plastic notes and coins, copy of price list from the school canteen, calculators, catalogues

- Provide students with plastic notes and coins. Present a scenario, e.g. Jack buys a drink from the school canteen that costs \$2.95. If he pays with a \$5.00 note, how much change would he receive?
- In pairs, have students model the scenario with one student being Jack and the other person a worker at the school canteen. Have them pay with a \$5.00 note, and then have the canteen worker count back the change using the ‘counting up to’ strategy, e.g. 5 cents is \$3.00 and \$2.00 makes \$5.00.
- Have students select their own items from the canteen list and work out which amount to pay with and what the change will be. Have students record their work.
- Have students swap roles.

Have students complete Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5, pp. 40–41.

Assessment Task/s

- Provide students with a single item with a price tag, e.g. a calculator costing \$22.90. Ask them to select an appropriate note to pay for the item and what the respective change will be.
- Ask, ‘Is this the smallest number of notes and coins you can use for change?’ Have them show a different combination of notes and coins as change.

Recommendations

- Have students who are experiencing difficulty work in a teacher focus group. Ask one student from the group to select an item from the canteen list. Then have the other students select how they are going to pay. Share the different responses asking students to justify their selections. Select one of the options and have the students find the change. Again share the responses and look for alternative answers, e.g. counting on by 10 cents each time. Have students record the different alternatives.
- Students who have a sound understanding can select a number of items from the canteen list, find the total cost (with or without a calculator) and then estimate what the change will be, e.g. approximately \$5.00, less than 50 cents, etc. Continue this by calculating the change.
- For practice, have students use catalogues to find an item they would like to buy. Have them cut out the item, attach it to a piece of paper, describe how they would pay for the item and then have the change listed below. Students can glue on pretend notes and coins or write the amounts.

Unit 20

Fraction Subtraction

Teacher Support Notes

Recommended introductory lesson to *Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5*, pp. 42–43

Teaching Focus: to subtract common fractions, simplify fractions and give fractions common denominators.

You will need: fraction pieces, dice

- Provide students with multiple copies of the same fractional circle or rectangle. Have the students model simple fraction subtraction equations such as $\frac{3}{4} - \frac{1}{4} =$ with their shapes and record their working and results. Invite students to share the process they used to solve the equations.
- Using the whole fractional shapes, have students complete subtraction from the whole, e.g. $1 - \frac{3}{4} =$, etc. Have students look for patterns such as ‘The answer is a number that adds to the numerator to total the denominator’ and collect ideas and comments on the whiteboard.
- Now have students work with multiple whole shapes and complete the subtraction equation by subtracting from the 1 whole to find the fractional part of the answer and counting the remainder wholes.

Have students complete Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5, pp. 42–43.

Assessment Task/s

- Provide students with a blank circle or rectangle. Pose a subtraction equation such as $1 - \frac{3}{5}$. Ask students to divide the shape and illustrate how to find the answer (e.g. cutting into pieces, shading, etc.).
- Now provide students with three blank shapes, and pose a subtraction equation such as $3 - 2\frac{1}{2}$. Ask students to represent this on their shapes using their preferred method.

Recommendations

- Have students experiencing difficulty work in a teacher focus group. Provide each student with a fractional shape. Work with halves and quarters before moving on, and have students model and record a variety of subtraction equations using the pieces, e.g. $\frac{3}{4} - \frac{1}{4}$ and $1 - \frac{1}{4}$ and $\frac{2}{4} - \frac{1}{4}$ and so on. Have students record one of the variations with the pieces by gluing the shapes and writing the equation below.
- For students who have a sound understanding, use the equations from *Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5*, pp. 42–43 or other equations. Have students write word questions to match the equations and record the answers on another sheet. Students can then swap the questions with a partner to solve.

- For practice, provide pairs of students with shapes that are divided into sixths, thirds and halves. These are placed in the middle. Then students roll a die, and the rolled number becomes the numerator of a fraction of sixths, e.g. if a 1 is rolled, it equals $1/6$, if a 2 is rolled it represents $2/6$ or $1/3$. With each roll students elect to take a piece of one of the three fractional shapes. The aim of the game is to take the most pieces.
- The activity can be extended with students trying to be the first to make one whole shape with the collected pieces.

Unit 21

Decimal Subtraction

Teacher Support Notes

Recommended introductory lesson to *Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5*, pp. 44–45

Teaching Focus: to use mental processes and written methods to subtract decimals.

You will need: modelling equipment such as MAB, digital camera (optional), grid paper

- Re-identify the MAB with students so that a flat = 1, a line = 1 tenth and singles = 1 hundredth.
- Pose a question such as $4.8 - 2.6$, and have students model it with the MAB, i.e. 4 flats and 8 lines – 2 flats and 6 lines. Have students lay out MAB in vertical format and complete the equation, recording the steps on the whiteboard. Practise with a number of simple equations and have students record the steps.
- Now have students complete equations that require carrying, e.g. $2.5 - 1.38$, again modelling with the MAB and trading 1 long for 10 singles, etc. Have students record their work. Note: a digital camera can be used for the purpose of recording.

Have students complete Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5, pp. 44–45.

Assessment Task/s

- Provide students with a subtraction equation and ask them to model it with the MAB.
- Have students record the question, working and answer. Ask students to complete the equation without the MAB, and check that the two answers are the same.

Recommendations

- Have students experiencing difficulty work in a teacher focus group. Provide each student with MAB materials only representing whole numbers and tenths. Have students practise simple subtraction equations, guiding them to work in the vertical format to make connections with normal subtraction. Have students record questions, working and answers. They might wish to include diagrams.
- For students who have a sound understanding, challenge them to rename the MAB to represent equations that have larger whole numbers. Have them create some equations and model them with the blocks, recording their work.
- For practice, provide students with grid paper. Have students practise writing subtraction equations in the vertical format. Pose questions that require the spaces to be filled with zeros to complete the subtraction, i.e. $4.1 - 2.36$. Allow students to use the MAB as support if required.

Unit 22

Addition and Subtraction

Teacher Support Notes

Recommended introductory lesson to *Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5*, pp. 46–47

Teaching Focus: to use mental processes and written methods to add and subtract numbers, and to use addition and subtraction to check each other's solutions.

You will need: pieces of card, calculators, 100 chart

- Pose an addition equation to students such as $49 + 87$ and have them calculate the solution and write out each component, i.e. 49, +, 87, =, 136 on different pieces of card.
- Have students write a subtraction sign on another piece of card. Now have students rearrange the cards of the first equation to create a subtraction equation, i.e. $136 - 87 = 49$. Have students share their equations and look at the two alternatives.
- Have students complete a number of different equations (starting with the addition and then the related subtraction equations) with tens, hundreds and thousands. Have students look for combinations of both addition and subtraction, and record their answers.

Have students complete *Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5*, pp. 46–47.

Assessment Task/s

- Provide students with an addition equation, and ask them to solve it, recording their answer. Then ask students to check the answer with an appropriate subtraction equation. (Provide blank cards for students to use if required.)
- Ask students questions such as, 'Is there another subtraction equation we could have used?'

Recommendations

- Have students who are experiencing difficulty work in a teacher focus group. Still working with the pieces of card, focus on checking addition equations. Provide students with calculators to enable them to quickly calculate the answers and focus on the process of using subtraction to check the addition. Alternatively students can complete the calculations and then check answers with calculators.
- Provide students who have a sound understanding with addition equations with three numbers and ask them to investigate how subtraction can still be used to check the answers. Have the students look for a number of alternatives and record their findings.
- For practice, provide pairs of students with number cards from a cut up 100 chart and have them select two cards from an up-turned pile. With these two cards, have one student create an addition or subtraction equation and then check the answer. Have the other student complete the process on a calculator, recording the equation and answer. Students should then swap roles.

Unit 23

Multiplication by 9

Teacher Support Notes

Recommended introductory lesson to *Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5*, pp. 48–49

Teaching Focus: to explore 9 times tables multiplication strategies.

You will need: 3, 6, 9 and 12 times-tables charts, tables answer grid, butcher's paper, hands-on materials such as Unifix

- Present students with copies of the 3 and 6 times tables. Have students explore the tables and look for any similarities and patterns. Record students' responses on the whiteboard.
- Now have students examine the 3, 6 and 9 times tables. Again record the students' findings of similarities or differences on the whiteboard. Provide students with the 12 times table and repeat the process.
- In pairs, have students complete a concept map linking the 3, 6, 9 and 12 times tables on butcher's paper.
- To extend the activity, practise the technique of calculating the 9 times tables with fingers as in *Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5*, p. 48.

Have students complete *Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5*, pp. 48–49.

Assessment Task/s

- Provide students with a selection of questions from the 9 times table and have students complete.
- Select one of the questions and ask students to explain, draw or show how they found the answer.

Recommendations

- Have students experiencing difficulty work in a teacher focus group. Provide hands-on materials for students to work on the 9 times tables, e.g. Unifix. These materials can be used for groupings of nine and then practising the '1 less 9 trick' and the '10 × take away the number trick' as in *Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5*, p. 49
- Encourage students who have a sound understanding to work with multiples of 10 and the 9 times tables, for example $30 \times 9 =$. Again have students look for patterns and investigate if the connections they made with the 3, 6 and 12 times tables still apply.
- For practice, play BINGO with the 3, 9, 6 and 12 times tables. The teacher calls out a times table question, and the students mark off the answers on their grids. The first to have the grid completely marked off wins. The aim of this activity is for students to make the links between the table sets so play two sets of tables together at one time such as 3 and 9 times tables.

Unit 24

Multiplication by 7

Teacher Support Notes

Recommended introductory lesson to *Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5*, pp. 50–51

Teaching Focus: to explore 7 times tables multiplication strategies.

You will need: blank calendar, tables chart

- Provide students with a copy of a blank calendar. Have students fill in the dates of the current month correctly.
- Have students investigate how many days in a week. Now ask, ‘How many days in 4 weeks?’ Allow students time to calculate, collect answers on the whiteboard and ask them to explain how they found the answers.
- Have students fill in the dates for a number of months and ask them to find how many days in ... weeks. Draw out the links between the number of days in a week and the 7 times tables.
- Extend the activity by having students start on a day during the middle of the week (for example, Wednesday) and calculating the number of days in 3 weeks starting from Wednesday the 3rd of January.

Have students complete Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5, pp. 50–51.

Assessment Task/s

- Provide students with a selection of questions from the 7 times table to complete.
- Select one of the questions and ask students to explain, draw or show how they found the answer.

Recommendations

- Have students experiencing difficulty work in a teacher focus group. Continue working with the calendars but focus on 2 or 3 months. Have students colour in the weeks in a different colour and write the number of days at the end of the week, i.e. Week 1 = 7 days, Week 2 = 14 days and so on. Then show students a copy of the 7 times tables and have students make the link between the totals of their weeks and the answers on the 7 times tables chart.
- For students who have a sound understanding, work with multiples of 10 and the 7 times tables, for example $30 \times 7 =$. Again have students look for patterns and investigate if the pattern they found on *Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5*, p. 51 still applies.
- For practice, have students write their own ‘quick quizzes’ with 10 questions written in context, e.g. 7 groups of 5 students, the days in 9 weeks. Select some of the quizzes and use with the class, with the writer as the questioner.

Unit 25

Doubles

Teacher Support Notes

Recommended introductory lesson to *Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5*, pp. 52–53

Teaching Focus: to use mental and written methods to multiply numbers.

You will need: times-tables charts 1–12, hands-on materials such as Unifix, calculators

- Ask students, ‘What does “double” mean?’ Collect student responses on the whiteboard, including examples.
- Provide students with a copy of the times tables 1–12, ask them to circle all of the tables that are doubles.
- Now ask students, ‘What might “double double” mean?’ Again collect student responses on the whiteboard in a different colour. Have students circle all of the tables that are “double doubles” on the tables chart in a different colour.
- Extend the activity by having students examine any connections between “doubles” and “double doubles”. They can write comments on the bottom of the times table sheets of their findings.

Have students complete Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5, pp. 52–53.

Assessment Task/s

- Provide students with a selection of times-tables questions that they can use doubling to solve.
- Select one of the questions and ask students to explain, draw or show how they found the answer. If they used a different technique, ask students to explain how they could solve the table using doubles.

Recommendations

- Have students experiencing difficulty work in a teacher focus group. Provide students with hands-on materials such as Unifix. Select a table such as 2×11 , have students count out 11 and then double the quantity to find the answer, keeping the quantities in two piles. Focus on language such as ‘double’. Work with a number of 2 times tables, then move to the 4 times tables, keeping the quantities in 4 piles. Then have students move two piles together for doubles, and then finally count the totals for the double doubles. Have students record their findings.
- For students who have a sound understanding, work on their tables charts identifying the ‘double double doubles’. Have students circle the relevant tables in a different colour. The activity can be extended with students creating a diagram illustrating the links between the three sets of doubles, i.e. “doubles, “double doubles” and “double double doubles”.
- For practice, provide students with a random number and ask them to double it and keep doubling. Have students record their answers on a sheet to share with the class. Calculators can be provided to help with the larger calculations and numbers such as decimals can also be used.

Unit 26

Multiplication by 10

Teacher Support Notes

Recommended introductory lesson to *Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5*, pp. 54–55

Teaching Focus: to use mental and written methods to multiply numbers.

You will need: chalk/masking tape, positive and negative numbers, 100 chart

- Create a place-value chart (large enough for students to stand in) on the floor or ground outside with chalk or masking tape.

Tens of thousands	Thousands	Hundreds	Tens	Ones

- Create number cards using positive numbers. Note: you will need multiple copies of each number.
- Present a number such as 50 and ask 2 students to collect the number cards and stand in the correct place-value positions.
- Pose the question, ‘What happens if we multiply 50 by 10?’ Invite students to respond, and have students model on the place-value chart by moving position, etc. Have students practise moving to the left by one place and adding a zero. You might wish to leave the first two students in their place and create a ‘new’ line for the moved number as on *Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5*, p. 54.
- Repeat for different numbers (e.g. 56, 185, 2490, etc.) with students moving position.

Have students complete Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5, pp. 54–55.

Assessment Task/s

- Provide students with a place-value chart (see page 56) and ask them to enter a number correctly on the chart.
- Have the students then multiply the number by 10 and re-write the number on the next line of the chart.

Recommendations

- Have students who are experiencing difficulty work in a teacher focus group. Allow students to practise with the chart on the floor. Have the students lay the numbers in the grids on the floor and then record what they are doing on a place-value chart.

- For students who have a sound understanding, have them use a place-value chart to illustrate multiplying by 5 by first multiplying by 10 (moving the number one place to the left) and adding a zero and then halving. Note: to keep students work clear, have them rule a line between each number and the calculations.
- For practice, provide students with a set of shuffled number cards to 100. The cards are placed between the two players. One card is turned over, and the first student to work out 10 times the number collects the card. Play continues. The activity can be extended by competing for 5 times the number on the card.

Unit 27

Multiplication by 20

Teacher Support Notes

Recommended introductory lesson to *Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5*, pp. 56–57

Teaching Focus: to use mental and written methods to multiply numbers.

You will need: calculators, 100 chart

- Ask students, ‘What numbers multiply to make 20?’ Collect responses on the whiteboard.
- Ask students, ‘How can we multiply a number by 20?’ Use 13×20 as an example. In pairs, have students solve the problem and clarify their strategy. Invite students to report and share what they found, recording comments on the whiteboard. Also check the answer.
- Focus on the ‘multiplying by 10 and doubling’ strategy.
- Pose the question, ‘Do you think that this strategy always works?’ Have students investigate a number of different questions such as 27×20 , 42×20 , 98×20 , 123×20 , etc. Have students check answers on calculators.
- Students can then share their answers and findings.

Have students complete *Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5*, pp. 56–57.

Assessment Task/s

- Provide students with a multiplication by 20 equation. Ask students to solve it.
- Then ask students to write a description of how they solved the equation.

Recommendations

- Have students who are experiencing difficulty work in a teacher focus group. Have students use a table as below (see page 59) to practise multiplying numbers by ten (start with single digits and then move to double digits). Then have students double the answer. Finally have the students complete the last column and make the connection.

Number	$\times 10$	double	$\times 20$
7			
4			
16			
29			

- For students who have a sound understanding, have them investigate the situation of adding two numbers and multiplying by 20. Have students examine the different processes, e.g. $(37 + 21) \times 20$, and see if it is the same as $(37 \times 20) + (21 \times 20)$. This activity can be extended to 3 numbers.
- For practice, provide students with a set of shuffled number cards to 100. Five cards are dealt to each person upside down. The students lay the cards down on the page (upside down). The aim of the game is to turn the card upright, write the equation '[number card] $\times 20 =$ ' and solve. The first to complete all five cards wins that round. Answers can be checked on calculators. The activity can be extended with students multiplying by 200 instead of 20.

Unit 28

Multiplication by 100

Teacher Support Notes

Recommended introductory lesson to *Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5*, pp. 58–59

Teaching Focus: to use mental and written methods to multiply numbers.

You will need: 1 metre rulers, tape measures

- Ask students, ‘How many centimetres in 1 metre?’ Provide students with 1 m rulers and have them check.
- Now ask, ‘How many centimetres in 3 m?’ Have students group together to have three rulers, and work out their answer. Ask students to share how they came up with their answer. Collect ideas and comments on the whiteboard.
- Ask students to work out how many centimetres in 25 m using one of the strategies discussed on the whiteboard.
- Have students work out the number of centimetres in a range of metre lengths, e.g. 47 m, 96 m, 149 m, etc.
- Draw out from students a shortcut method for finding the number of centimetres in a metre, e.g. add 2 zeros to the number.

Have students complete *Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5*, pp. 58–59.

Assessment Task/s

- Provide students with a 4 m long ruler and ask them to calculate how many centimetres in 5 m.
- Ask students to explain how they found the answer.

Recommendations

- Have students experiencing difficulty work in a teacher focus group. Have students use a table as below (see page 62) to practise multiplying numbers by ten. Start with single digits and then move to double digits. Then have students multiply the answer by ten. Finally have the students complete the last column, making the connection.

Number	$\times 10$	Answer $\times 10$	$\times 100$
7	70	700	700
4			
16			
29			

- For students who have a sound understanding, have them calculate the number of metres in a number of kilometres (i.e. multiplying by 1000). The activity can be further extended by calculating the number of centimetres in a number of kilometres.
- For practice, have students measure a set of distances between locations to the nearest metre using metre rulers or tape measures, e.g. 3 m from the teacher’s desk to the bin, 25 m is the length of the school hall, etc. Have students present their findings in metres and centimetres.

Unit 29

Multiplication by 50

Teacher Support Notes

Recommended introductory lesson to *Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5*, pp. 60–61

Teaching Focus: to use mental and written methods to multiply numbers.

You will need: calculators, number cards to 100

- Ask students, ‘How can we find the answer to 7×50 ?’ In pairs, have students discuss and then collect ideas and comments on the whiteboard.
- Divide the class into 2 groups. Have Group 1 examine the strategy of $\times 100 \div 2$ and Group 2 examine the strategy of 10×5 . Have students work in pairs, with one person from Group 1 and one person from Group 2.
- Present the students with a set of calculations, e.g. 8×50 , 22×50 , 37×50 , 59×50 and so on. Have each member of the group find the answers using their strategy. Once completed have students compare their answers (they should be the same). Have each ‘expert’ share their method and allow students to swap roles if they wish.

Have students complete Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5, pp. 60–61.

Assessment Task/s

- Provide students with a calculation such as 45×50 . Ask students to calculate the answer.
- Ask students to describe how they found the answer. Have students identify which initial group they were from.

Recommendations

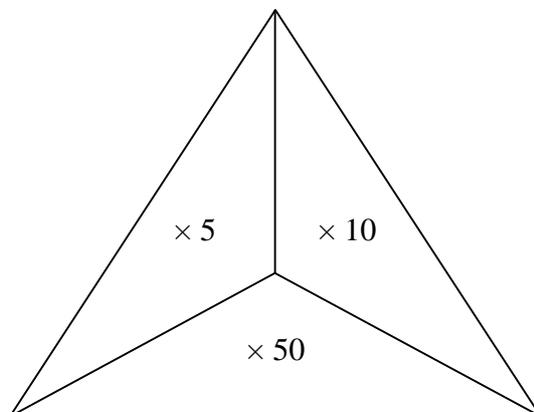
- Have students who are experiencing difficulty work in a teacher focus group. Have students use a table as below (see page 65), to practise multiplying numbers by 100, starting with single digits and then moving to double digits. Then have students halve the answer. Finally have students complete the last column and make the connection.

Number	$\times 100$	Halve	$\times 50$
7			
4			
16			
29			

Students can be provided with calculators as support.

- For students who have a sound understanding, investigate the situation of adding two numbers and multiplying by 50. Have students examine the different processes, for example $(37 + 21) \times 50$ and see if it is the same as $(37 \times 50) + (21 \times 50)$ using the $100 \div 2$ strategy and then the 10×5 strategy. Students can create a poster linking the similarities and differences between the two methods.

- For practice, provide pairs of students a set of shuffled number cards to 100) and a spinner created from the template below. Have one of the students spin the spinner (this is the multiple) and the other student turn the card over. The first to calculate the answer correctly collects the card. Calculators can be used to settle disputes.



Unit 30

Multiplication of Decimals

Teacher Support Notes

Recommended introductory lesson to *Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5*, pp. 62–63

Teaching Focus: to use mental and written methods to multiply decimals.

You will need: pieces of card, calculator

- Provide students with pieces of card, and ask them to expand a decimal number such as 1.31 onto the cards, where each component (1, ., 3, 1) is on a separate piece of card.
- Have the students lay the cards in the correct order in front of them on the table. Ask students, ‘How can you rearrange the cards to show 1.31×10 ?’ Have the students explore using the cards. Share responses on the whiteboard and illustrate a systematic move, such as spreading the cards out and moving the decimal point as a ‘jump’ which can be highlighted with an arrow on the whiteboard.
- Have the students lay the cards back in the order of 1.31 and ask, ‘How can you rearrange the cards to show 1.31×100 ?’ Again have students explore and share.
- Continue with a number of examples. Note: cards can be conserved by using a different number with the same digits (e.g. 1.13, 3.11) or by turning the cards over and writing on the back.

Have students complete Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5, pp. 62–63.

Assessment Task/s

- Provide students with a calculation such as 1.76×10 . Ask students to calculate and record the answer. Repeat with 1.76×100 and again have students calculate and record the answer. (Provide cards for those who wish to use.)
- Ask students to describe how they found the answer for one of the questions. Ask, ‘Is there another way of finding the answer?’

Recommendations

- Have students experiencing difficulty work in a teacher focus group. Have students work with cards, but only using one decimal place and multiplying by 10. Have students record the questions and answers and write a comment about their observations. Then move to two decimal places but still multiplying by 10. Again have students record questions and answers and make a comment. Students can be encouraged to check answers with a calculator.
- For students who have a sound understanding of multiplying decimals by 10 and 100, extend to include decimals with three decimal places.
- For practice, provide students with shopping catalogues and have them select a number of items and find the total cost of 10 items and 100 items. Students can set their working out in a table such as on *Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5*, p. 62.

Unit 31

Division by 5s and 10s

Teacher Support Notes

Recommended introductory lesson to *Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5*, pp. 64–65

Teaching Focus: to divide by 5s and 10s, linking multiplication table skills.

You will need: tables answer grid, tables chart, 100 chart, catalogues

- Provide students with a tables answer grid and play a game of BINGO with the 5 and 10 times tables. Note: Students use the 5 and 10 times tables and write the answers on the grid the teacher selects and reads out questions from the two sets of tables. Students cross off the answer if they have it. Play continues, and the winner is the first player with all numbers crossed off in the grid. Play a number of times.
- Ask students, ‘What do you notice about the answers of the 5 and 10 times tables?’ Collect responses on the whiteboard.
- Have students play BINGO, but play it ‘backwards’ this time (as division). For example, the teacher reads out ‘ $25 \div 5 =$ ’ and the students cross off the answers in their grids. Play a number of times.
- Ask students, ‘What might be a shortcut for finding the answers to dividing by 5, e.g. $95 \div 5$?’ Collect ideas and comments on the whiteboard. Have students try a number of examples and comment on them.

Have students complete Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5, pp. 64–65.

Assessment Task/s

- Provide students with a set of 10 division equations using division of 5 and division of 10. Make the first half of the set with tables-based numbers, and then the second half with larger numbers (outside the tables-based numbers).
- Select one question from the first half (tables-based) and one from the second half and ask students to write and describe how they solved the questions.

Recommendations

- Have students experiencing difficulty work in a teacher focus group. Play the ‘backwards’ BINGO game a number of times. Students might need the support of a tables chart. Then have students examine the 5 times and 10 times tables chart for patterns and similarities.
- For students who have a sound understanding of the division process, have them solve some money questions, i.e. ‘How many 10 cent coins in ...’ and ‘How many 5 cent coins in ...’ Students can be provided with catalogues for the amounts.
- For practice, provide students with a set of number cards from a cut up 100 chart. Have the students work in threes. One student turns over a card, the second student rounds the number to the nearest 5 and the third student divides by 5. Rotate the roles around the circle.

Unit 32

Division by 2s, 4s and 8s

Teacher Support Notes

Recommended introductory lesson to *Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5*, pp. 66–67

Teaching Focus: to divide by 2, 4 and 8, linking number patterns.

You will need: tables chart, butcher’s paper, pieces of card, calculators

- Provide students with a range of even numbers (e.g. 12, 26, 34, 88, 110) and ask them to work in pairs to divide these numbers by 2. Ask students, ‘How did you find the answer?’ Collect responses on the whiteboard in one colour.
- Now repeat with numbers that can be divided by 4 (e.g. 16, 40, 96, 120) again with students working in pairs. Check answers, and ask students to share how they found the answers. Collect responses on the whiteboard in a different colour.
- Finally repeat with numbers that can be divided by 8 (e.g. 24, 48, 64, 112) again with students working in pairs. Check answers and ask students to share how they found the answers. Collect responses on the whiteboard in a third colour.
- Have students create a concept map on butcher’s paper linking the process of division by 2s, 4s and 8s together.

Have students complete Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5, pp. 66–67.

Assessment Task/s

- Provide students with a number, e.g. 428, and ask them to work out if the number can be divided by 2, 4 and/or 8 and record their answers.
- Ask students to list the strategies they used in solving this problem. Note: it is best to select a number that will not be divisible by all 3.

Recommendations

- Have students experiencing difficulty work in a teacher focus group. Begin examining numbers that can be divided by 2. Work with numbers less than 50, and have students look for patterns. Have students write a comment about their findings. Then work with the 4 times table and examine the patterns in the answers before starting to look at numbers divisible by 4. Repeat the process with the 8 times tables.
- For students who have a sound understanding of the division process, have them explore numbers that can be divisible by 16. Have students start with working out the 16 times table, 1–12 and then examining the patterns in the answers to see if they can develop a ‘rule’. Note: students might need to use calculators.
- For practice, have students write down 10 answers on pieces of card – five that can be divisible by 2, 4 or 8 and five that cannot. Have students mix the answers up, and then swap with a partner who has to work out which answers can and which answers cannot be divided by 2, 4 or 8. Have students record their findings. Students can then swap their card set with another person.

Unit 33

Division with Zeros

Teacher Support Notes

Recommended introductory lesson to *Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5*, pp. 68–69

Teaching Focus: to use mental and written methods to divide numbers with zeros.

You will need: tables chart, calculators

- Provide students with a copy of the 10 times table. Have students look at patterns in the answers compared to the question, e.g. add a zero, etc. Collect students' responses on the whiteboard. Ask students, 'How can we use this information to divide by 10?' Draw out from students about 'removing a zero'.
- Try the idea to see if it works by providing students with a range of numbers, e.g. 240, 390, 800, 1200, etc. Have students use calculators to check answers.
- Ask, 'Do you think this idea would work when dividing by 100?' Collect students' comments on the whiteboard and again experiment with questions and checking on the calculators. The activity can be extended to examine dividing by 1000.

Have students complete *Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5*, pp. 68–69.

Assessment Task/s

- Provide students with a number, e.g. 4600 and ask, 'Is it possible to divide this number evenly by 10? 100? 1000?' Have students find and record the answer.
- Ask students to describe how they worked out the answer. This can be repeated with different numbers.

Recommendations

- Have students experiencing difficulty work in a teacher focus group. Begin with dividing by 10. Provide students with a range of numbers and invite them to enter them into the table as below. Students should then cross off one zero in the second column and then write the answer in the third column.

Number	Divide by 10	Answer
450	450	45
900	900	90

Repeat the activity for dividing by 100 and then 1000, using a different table each time.

- For students who have a sound understanding of the division process, have them explore the links with millimetres, centimetres and metres.

i.e. 10 mm = 1 cm (divide by 10)
100 cm = 1 m (divide by 100)
1000 mm = 1 m (divide by 1000)

They might like to include kilometres as well. Have students create a chart highlighting the links.

- For practice, write a series of numbers on cards, e.g. 360, 4500, 96 000. Drop them into a container. Students select one card at a time and work out if the number can be divided by 10, 100 or 1000. If it is 10, students score 1 point, for 100 they score 2 points and for 1000 they earn 3 points. Have students record their score. Then the next student selects a card and the activity continues.

Unit 34

Decimal Division

Teacher Support Notes

Recommended introductory lesson to *Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5*, pp. 70–71

Teaching Focus: to use place-value strategies when dividing decimals by 10 and 100.

You will need: pieces of card, chalk or masking tape, calculators, chart paper

- Provide students with pieces of card and ask them to expand a number such as 131 onto the cards, where each component (1, 3, 1) is on a separate piece of card.
- Have students lay the cards in the correct order in front of them on the table. Ask students, ‘How can you rearrange the cards to show $131 \div 10$?’ Have students explore using the cards. (Students will need to create a decimal point.) Share responses on the whiteboard and illustrate a systematic move such as spreading the cards out and moving the decimal point as a ‘jump’, which can be highlighted with an arrow on the whiteboard.
- Have the students lay the cards back out in the order of 131 and ask, ‘How can you rearrange the cards to show $131 \div 100$?’ Again have students explore and share.
- Continue with a number of examples. Note: cards can be conserved by using a different number with the same digits (e.g. 113, 311) or by turning the cards over and writing on the back.

Have students complete Nelson Maths: Australian Curriculum Building Mental Strategies Skill Book 5, pp. 70–71.

Assessment Task/s

- Provide students with a calculation such as $176 \div 10$. Ask students to calculate and record the answer. Repeat with $176 \div 100$ and again have students calculate and record the answer. (Provide cards if students wish to use them.)
- Ask students to describe how they found the answer for one of the questions. Ask, ‘Is there another way of finding the answer?’

Recommendations

- Have students experiencing difficulty work in a teacher focus group. Have students work with cards, but only using 2-digit numbers and dividing by 10. Create a grid using chalk or masking tape on the floor and have students place the cards in the grid. Then have them move the cards for the division by 10. Repeat a number of times. Then move to 3-digit numbers but still dividing by 10. Students can be encouraged to check answers with a calculator.
- Extend students who have a sound understanding of dividing by 10 and 100 by including decimals with up to three decimal places.

- For practice, provide students with a set of numbers, e.g. 4, 29, 86, 135, 245, 1062, 41.9, 6.5, 100.2, etc. Have the students write the first number (4) on one piece of card, then divide by 10 (i.e. 0.4) and write that on another piece of card, and finally divide by 100 (i.e. 0.04) and write that on a third piece of card. Then have the students order the numbers from smallest to largest and stick them onto a sheet of chart paper. Repeat the process with other numbers in the list. When complete, have students write a comment about the division of 10 and 100 and any patterns they have discovered.