Numeracy strategies by skill level grid

Levels	Descriptors	Learning intention	Junior Years			Middle Years			Upper Years		
			Teaching Strategy	Learning Activity	Category	Teaching Strategy	Learning Activity	Category	Teaching Strategy	Learning Activity	Category
A	Add and skip count numbers less than 20. Match number names with numerals. Recognise numeric patterns (skip count forward 2s, 4s and 5s). Carry out single digit addition and multiplication as repeated addition.	*Students will be able to count forward and backward in number patterns.*	Colour coding patterns on number charts/lines for visual prompting.	Students skip count based on colour codes.	Individualistic / Expositive	Revision of oral counting (skip counting) patterns beginning and ending at various positions on the number line.	Students take turn to skip count from different positions based on their seating arrangement in a circle.	Associative / Expositive	Specialist teaching support recommended		
		Students will be able to name the numerals and identify the quantity they represent	• Teacher will model (personally, or by a video, a worksheet, a laboratory work description, etc) counting and pointing to the corresponding numerals. • Teacher will use concrete materials to illustrate the quantity that the numbers represent, counting them and showing the numeral.		Associative / Expositive	• Teacher will use concrete materials to illustrate the quantity that the numbers represent, counting them and showing the numeral.		Associative / Expositive			
			• Using different activities, teacher will provide students the opportunity to match numerals with names and quantity.	• In groups, students solve puzzles by matching the number names to numerals and give examples of the quantities. • Thinkboard. Students make the number using icypoles sticks/MAB, they write the number in digits and words, they include it in a number sentence and they draw what it looks like.	Associative / Expositive	• Using different activities, teacher will provide students the opportunity to match numerals with names and quantity.	• In groups, students will: - play games such as the number bingo game. - explore different groups of objects, counting them to recognise its quantity. - write the number in digits and words and include it in a sentence. • Students will hold a number party.	Associative / Expositive			
B	Classify numbers as odd and even. Understand meaning of base 10. Read and write numbers using base ten numerals. Count within 1000 (skip count by 5, 10 and 100). Addition/subtraction of two digit numbers without trading. Extend numeric and symbolic patterns.	*Students will be able to understand place value, that 10 of these equals 1 of those.*	Using visual representations, teacher will explain base 10 system.	• Trading MAB from tens to ones and ones to tens. Make the number another way, using MAB, sticks.	Individualistic / Interrogative	Using visual representations, explain base 10 system.	• Using blank number lines or 1000 chart, students fill in the gaps or parts of the blank chart.	Expositive / Investigative	Specialist teaching support recommended		
				• Children video themselves making and naming 3-digit numbers using words 'tens' and 'hundreds'.	Expositive / Technological		• Using bundling sticks and place value chart, students play 'Bundle a Ten' and 'Make a Ten' games.	Associative / Expositive			
		Students will be able to classify numbers as odd and even.	• Teacher will model (personally, or by a video, a worksheet, a laboratory work description, etc) classification strategy/approach to identify if a number is even or odd, emphasising the understanding of the rules that will allow students to identify it. • Teacher will model (personally, or by a video, a worksheet, etc) counting even and odd numbers from any given 2 digit number.	• Students count out loud up and down in even numbers or odd numbers. Then from any given 2 digit number.	Individualistic / Expositive	• Teacher will model (personally, or by a video, a worksheet, a laboratory work description, etc) classification strategy/approach to identify if a number is even or odd, emphasising the understanding of the rules that will allow students to identify it. • Teacher will model (personally, or by a video, a worksheet, etc) counting even and odd numbers from any given 2 digit number.	• Students work with different sets of objects, arranging each group into pairs and deciding whether the number is odd or even. • When decision is made student marks on number grid whether the object is odd or even, using colouring.	Individualistic / Expositive			
			• Using different activities, teacher will provide students the opportunity to classify numbers as even or odd.	• Students work with different sets of objects, arranging each group into pairs and deciding whether the number is odd or even. • Students compete in groups to classify 2 digit numbers as even or odd.	Associative / Investigative	• Teacher will challenge students to use patterns to classify all numbers on the grid as odd or even.	• Students examine patterns in grid to generalise the pattern of odd and even numbers alternating.	Associative / Investigative			
		Students will be able to read, write and order numbers using base ten numerals.	Teacher will make numbers between 20-1000 using concrete materials and will arrange biggest to smallest.	• Games such as ladder (biggest to smallest). Placing a series of number cards in order.	Performative / Deliberative	Make numbers between 20-1000 using concrete materials and arrange biggest to smallest.	• Games such as ladder (biggest to smallest). Placing a series of number cards in order.	Performative / Deliberative			
C	Perform addition and subtraction operations on whole digit numbers with and without trading. Multiply by 10. Knowledge of place value (units, tens and hundreds). Solve one step addition and subtraction word problems. Find unknown single digit number in addition or subtraction equation.	*Students will be able to understand and apply place value.*	• Teacher will model (personally, or by a video, a worksheet, a laboratory work description, etc) the activity of 'Make it to 100' using mathematical vocabulary to explain what they are doing. • Using different activities, teacher will provide students the opportunity to apply place number.	• Make It to 100. Roll the dice and take that many MAB. First collect 'minis / ones', then when they roll and the total gets above 10 they have to do a 'fair trade'. Trading minis/ones for longs/tens. First to 100 and then back to zero. Could write down their running totals in columns.	Performative / Investigative	• Teacher model (personally, or by a video, a worksheet, a laboratory work description, etc) the place value chart using mathematical vocabulary to explain what they are doing. • Teacher will organise an excursion to record and classify car number plates in the school parking and near the school zone.	• Place value number chart TH|H|T|U etc. • Students record number plates of teachers' cars (and cars going past the school) in a template provided by the teacher. • Students put number plates in order smallest to largest.	Performative / Investigative	• Teacher model (personally, or by a video, a worksheet, a laboratory work description, etc) the place value chart using mathematical vocabulary to explain what they are doing. •Teacher will explain the link between the words and the model, asking the students to make their own number expander to represent larger or small numbers.	• Place value number chart TH|H|T|U etc. • Make their own number expander to represent large or small numbers.	Performative / Investigative
		Students will be able to identify the pattern to find an unknown number.	• Teacher will use different interactive activities to develop addition and subtraction skills.	Interactive activities include: 3 in a row, number path, calculator game, guess my number.	Individualistic / Investigative	Teacher will use different interactive activities to develop addition and subtraction skills.	Interactive activities include: 3 in a row, number path, calculator game, guess my number.	Individualistic / Investigative	Teacher will use different interactive activities to develop addition and subtraction skills.	Interactive activities include: 3 in a row, number path, calculator game, guess my number.	Individualistic / Investigative
D	Add and subtract with whole digit numbers up to 1000 using knowledge of place value, properties of operations and relationship between addition and subtraction. Represent and solve word problems involving multiplication and division. Recognise fractions (1/2, 1/3, 1/4, 1/5) as a part of a whole.	*Students will be able to use common fractions to represent a part of a whole.*	• Teacher will use a fraction wall, measuring cups and fraction strips to explore and explain ideas about a relationship between a part and a whole (part-whole relationship).	• Visualise the size of a fraction, through a number line - a tool for representing and comparing fractions. Use words to label the fractions.	Individualistic / Expositive	• Teacher will use a fraction wall, measuring cups and fraction strips to explore and explain ideas about a relationship between a part and a whole (part-whole relationship).	• Visualise the size of a fraction, through a number line - a tool for representing and comparing fractions. Use words to label the fractions.	Individualistic / Expositive	• Teacher will use a fraction wall, measuring cups and fraction strips to explore and explain ideas about a relationship between a part and a whole (part-whole relationship).	• Visualise the size of a fraction, through a number line - a tool for representing and comparing fractions. Use words to label the fractions.	Individualistic / Expositive
		Students will be able to match the words, symbols and physical representations of one half, one quarter and one third.	• Teacher will demonstrate various activities as described in the listed learning activities. • Teacher will encourage children to give real-life examples when fractions are useful.	• Fold a paper strip chocolate bar in half to make demonstrate sharing halves. Use same strategy to partition kinder squares, play dough, pile of counters. Repeat for fourths: halve and halve again. Repeat spreading activity with thirds on square bread slices.Spread a salada with vegemite. Discuss different fractional parts.	Associative / Investigative	• Teacher will encourage children to give real-life examples when fractions are useful. • Teacher will give cards with the words 'half', 'third' and 'fifth' to different pairs of students. Students will be asked to think of situations that explain what one half, one third and one fifth represent. • Teacher will organise a cooking session with students to follow a recipe in which they need to use 1/2, 1/3 and ¼	• In groups, students will model a situation in which half, third or fifth of the whole is being used. Students can draw, cut, and paste pictures, colour paper, write a story, etc. Students share ideas. Display work on wall and discuss with other pairs of students. • Students will follow recipes to cook different things in which they need to use 1/2, 1/3 and 1/4 of the ingredients.	Performative / Investigative	Teacher will: • give each student a set of cards described under student activity. • allocate time for students to make individual decisions. • organise students into pairs for discussion of decisions. • debrief with group to identify any remaining misconceptions.	• Students will receive a card set with the symbol, the words and various physical representations of 1/2, 1/3 and 1/4. • Students will arrange cards into sets representing one half, one third and one quarter. Students need then to explain to a partner why they made their choices. • Students will make different physical representations of these fractions.	Associative / Investigative
		Students will be able to add and subtract 3 digit numbers which include renaming (borrowing and trading).	• Teacher will model (personally, or by a video, a worksheet, a laboratory work description, etc) addtion and subtraction of 3 digit numbers using counters and MAB.	Students solve addition and subtraction problems in groups using: • Counters, MAB • Clipboard • Game – (trading game with counters)	Associative / Expositive	• Teacher will model (personally, or by a video, a worksheet, a laboratory work description, etc) addtion and subtraction of 3 digit numbers using counters and MAB	Students solve addition and subtraction problems in groups using: • Counters, MAB • Clipboard • Game – (trading game with counters)	Associative / Expositive	• Teacher will model (personally, or by a video, a worksheet, a laboratory work description, etc) addtion and subtraction of 3 digit numbers using counters and MAB	Students solve addition and subtraction problems in groups using: • Counters, MAB • Clipboard • Game – (trading game with counters)	Associative / Expositive
E	Use properties of operations as strategies to multiply and divide. Round numbers using the knowledge of place value. Represent whole number on the number line, find segment length and understand concept of unit segment. Recognise unit fractions in both numerical and geometrical form (express area of a part of a shape as a fraction). Compare fractions with same denominator or numerator. Describe and extend geometric and numeric patterns.	*Students will be able to repeat addition as arrays, using the language of multiplication like "by" and "multiply".*	Teacher will introduce symbols to represent arrays using visual illustrations.	Students use arrays as a representation for multiplication.	Individualistic / Expositive	• Teacher will read arrays as a representation for multiplication. Introduce symbols to represent arrays.	• Students will model arrays using a range of concrete materials, exploring symbols to represent it.	Individualistic / Expositive	To read arrays as a representation for multiplication. Introduce symbols to represent arrays.	• Students will model arrays using a range of concrete materials, exploring symbols to represent it.	Individualistic / Expositive
		Students will be able to understand the commutative property for multiplication.	Teacher will model (personally, or by a video, a worksheet, a laboratory work description, etc) the use of arrays eg 3x4 and 4x3 to explain the relationship.	Students will represent multiplication by using concrete materials and grid paper.	Investigative / Performative	Teacher will model (personally, or by a video, a worksheet, a laboratory work description, etc) the use of arrays eg 3x4 and 4x3 to explain the relationship.	Students will represent multiplication by using concrete materials and grid paper.	Investigative / Performative	Teacher will model (personally, or by a video, a worksheet, a laboratory work description, etc) the use of arrays eg 3x4 and 4x3 to explain the relationship.	Students will represent multiplication by using concrete materials and grid paper.	Investigative / Performative
		Students will be able to understand the meaning attached to the numerator and denominator.	• Teacher will illustrate the meaning of denominator and numerator using concrete materials. • Teacher will ask students to work in groups using pre-cut 'tiles' to explore the concept of denominator and numerator.	• Students will explore the meaning of numerator and denominator using: - Paper folding activities - Make me 3/4 - Sticky numbers • Students use pre-cut 'tiles' (ex cut into 3,4,8 & 10 equal pieces) They are asked to pick up 1 of the pieces and name the piece. (Extend to multiple pieces).	Individualistic / Interrogative	• Teacher will illustrate the meaning of denominator and numerator using concrete materials. • Teacher will ask students to investigate around the school environment where fractions are displayed or can be used, analysing the meaning of numerator and denominator.	• Students will explore the meaning of numerator and denominator using: - Paper folding activities - Make me 3/4 - Sticky numbers • Students look around the school environment to see where fractions are displayed or can be used, to then present these examples explaining the meaning of numerator and denominator.	Individualistic / Interrogative	• Teacher will lead paper folding activity emphasising the number of equal parts as naming the parts (denominator from the Latin meaning name). • Teacher then will use paper folding outcomes to have students colour designated numbers of parts, the numerator (from Latin meaning count).	Students wil: • complete paper folding activities with an emphasis on how many equal parts are produced by the activity and how this is recorded. • complete designated colour parts activity with an emphasis on the number of equal parts coloured and how that is recorded. • choose a fraction and create it by paper folding and present it to a partner who has to describe how to create the name, in words and symbolically.	Individualistic / Interrogative
F	Represent fractions on number line. Recognise and generate equivalent fractions (denominator 2, 3, 4, 6, 8). Add and subtract fractions with same denominator. Use decimal notation for fraction (convert between decimals and fractions). Use four operations and their properties to solve word problems; involving calculations with distances, money and time.	*Students will be able to recognise equivalent fractions.*	Teachers will let students explore equivalences and challenge them to explain the reasons for the equivalences (see learning activity)	In groups, students will explore: • partitioning a real object into halves, thirds and fifths • partitioning an identical object into sixths, eighths, ninths, tenths • comparing the parts to discover equivalences	Associative / Interrogative	Teachers will let students explore equivalences and challenge them to explain the reasons for the equivalences (see learning activity)	In groups, students will explore: • partitioning a real object into halves, thirds and fifths • partitioning an identical object into sixths, eighths, ninths, tenths • comparing the parts to discover equivalences	Associative / Interrogative	Teachers will let students explore equivalences and challenge them to explain the reasons for the equivalences (see learning activity)	In groups, students will explore: • partitioning a real object into halves, thirds and fifths • partitioning an identical object into sixths, eighths, ninths, tenths • comparing the parts to discover equivalences	Associative / Interrogative
		Students will be able to add and subtract fractions with the same denominator.	• Teachers will model (personally, or by a video, a worksheet, a laboratory work description, etc) the addition and subtraction of fractions with concrete objects and diagrams (the explanation should emphasize estimation and judging the reasonableness of answers)	In groups, students will: • use concrete objects and diagrams to add and subtract fractions with the same denominator • evaluate the reasoneableness of the results obtained	Expositive / Associative	• Teachers will model (personally, or by a video, a worksheet, a laboratory work description, etc) the addition and subtraction of fractions with concrete objects and diagrams (the explanation should emphasize estimation and judging the reasonableness of answers)	In groups, students will: • use concrete objects and diagrams to add and subtract fractions with the same denominator • evaluate the reasoneableness of the results obtained	Expositive / Associative	• Teacher will: - Oversee construction of fraction walls. - Propose some problems for students to solve - Encourage students to create and solve their own problems - Place an emphasis on recording so that students can see the link between the conceptual idea and the mathematical recording of the problem"	• Students create their own fraction wall. • Using the fraction wall students identify equivalent fractions.	Associative / Investigative
		Students will be able to use operations to solve problems involving equivalent fractions.	Following a progression of using models, words and then symbols, teacher will model the use of diagram to solve real life problems (including number lines, fraction walls, collections) involving equivalent fractions.	• Using models and concrete objects, students will record the addition and subtraction of simple fractions through demonstrating equivalence. e.g. ¼ is the same as 2/8 therefore ¼ + 1/8 is the same as 2/8 + 1/8 = 3/8	Expositive / Deliberative	Following a progression of using models, words and then symbols, teacher will model the use of diagram to solve real life problems (including number lines, fraction walls, collections) involving equivalent fractions.	• Using models and concrete objects, students will record the addition and subtraction of simple fractions through demonstrating equivalence. e.g. ¼ is the same as 2/8 therefore ¼ + 1/8 is the same as 2/8 + 1/8 = 3/8	Expositive / Deliberative	Following a progression of using models, words and then symbols, teacher will model the use of diagram to solve real life problems (including number lines, fraction walls, collections) involving equivalent fractions.	• Using models and concrete objects, students will record the addition and subtraction of simple fractions through demonstrating equivalence. e.g. ¼ is the same as 2/8 therefore ¼ + 1/8 is the same as 2/8 + 1/8 = 3/8	Expositive / Deliberative
											[list here]

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			Teaching Strategy	Learning Activity	Category	Teaching Strategy	Learning Activity	Category	Teaching Strategy	Learning Activity	Category
G	Use properties of equivalent fractions to add and subtract fractions. Compare fractions with different numerators and denominators. Multiply and divide fractions. Understand the concept of unit rate and use ratio reasoning to solve problems. Rates and percentages (find a percent as a rate over 100). Apply properties of operations to generate equivalent expressions. Estimate and calculate absolute and relative error of rounding.	*Students will be able to:* · *convert common fractions such as ½ , ¼ , ¾ , 1/3, 2/3 into decimal and percentage equivalents.* · *express single digit decimals as fractions in their simplest form.*	Teacher will explain the use of language that is associated with ½ ie half price – 50% off, ½ a dollar ; 50c or .50, equivalent fractions tenths and hundredths and show the equivalence between them.	In group, students will: • Place fractions, decimals and percentages individually and them mixed on a number line, fraction cards or fraction models • Calculate equivalences used in advertisements, catalogues, 100 grids	Associative / Interrogative	Teacher will explain the use of language that is associated with ½ ie half price – 50% off, ½ a dollar ; 50c or .50, equivalent fractions tenths and hundredths and show the equivalence between them.	In group, students will: • Place fractions, decimals and percentages individually and them mixed on a number line, fraction cards or fraction models • Calculate equivalences used in advertisements, catalogues, 100 grids to prepare a poster of the available products and prices	Associative / Interrogative	Teacher will explain the use of language that is associated with ½ ie half price – 50% off, ½ a dollar ; 50c or .50, equivalent fractions tenths and hundredths and show the equivalence between them.	In group, students will: • Place fractions, decimals and percentages individually and them mixed on a number line, fraction cards or fraction models • Calculate equivalences used in advertisements, catalogues, 100 grids	Associative / Interrogative
					Expositive / Investigative	Teacher will model (personally, or by a video, a worksheet, a laboratory work description, etc) the comparision of fractions and percentages, explaining how the order can be solved.	In groups and using the posters prepared on the previous learning activity, students will order the products from the cheapest to the dearest based on: • the percentage discount • the final price Then students will evaluate the best offer.	Expositive / Investigative	Teacher will model (personally, or by a video, a worksheet, a laboratory work description, etc) the comparision of fractions and percentages, explaining how the order can be solved	In groups and using the posters prepared on the previous learning activity, students will order the products from the cheapest to the dearest based on: • the percentage discount • the final price Then students will evaluate the best offer.	Expositive / Investigative
		Students will be able to understand the concept of 'a whole' in context of %.	Teacher will use real life situations to apply the concept e.g. I pay $50 for a dress which was marked down by 30%. What was the original price?	Represent solutions in various forms, tables, graphs, flow charts	Individualistic / Interrogative	Teacher will use real life situations to apply the concept e.g. I pay $50 for a dress which was marked down by 30%. What was the original price?	Represent solutions in various forms, tables, graphs, flow charts	Individualistic / Interrogative	Teacher will use real life situations to apply the concept e.g. I pay $50 for a dress which was marked down by 30%. What was the original price?	Represent solutions in various forms, tables, graphs, flow charts	Individualistic / Interrogative
		Students will be able to compare fractions with different numerators and denominators.	Teacher will: • Ask students to review fractions with same numerators but different denominators. • Demonstrate the use of a variety of concrete models to compare the size of fractions. • Explain the method of changing the denominators of fractions without altering the value of the fraction ('cross over' method and/or factors/multiples method).	• Students compare different fractions using a variety of concrete models. • Students work with pre-cut 'tiles' (of the same size) to compare physical sizes of fractions	Expositive/ Individualistic	Teacher will: • Demonstrate the use of a variety of concrete models to compare the size of fractions. • Review factors and multiples, explaining students how to make denominators the same. • Ask students to work with 'tiles' cut into different parts to then make each fraction have the same denominator.	• Students use a 'tile' cut into three equal parts and a 'tile' cut into 4 equal parts. Students take 2/3 and ¼ and need to find a strategy to compare them. • Students investigate on different strategies to compare fractions with different denominator.	Associative / Interrogative	Teacher will: • Demonstrate the use of a variety of concrete models to compare the size of fractions. • Review factors and multiples, explaining students how to make denominators the same. • Ask students to work with 'tiles' cut into different parts to then make each fraction have the same denominator.	• Students use a 'tile' cut into three equal parts and a 'tile' cut into 4 equal parts. Students take 2/3 and ¼ and need to find a strategy to compare them. • Students investigate on different strategies to compare fractions with different denominator.	Associative / Interrogative
H	Use proportional relationship to solve problem including discounts, taxes and interest rates. Represent analyse, and generalise different patterns using tables, graphs and symbolic rules. Relate and compare different forms of representation for a relationship. Solve an inequality involving fractions.	*Students will be able to solve inequalities involving fractions.*	Teacher will explain the concept of inequality is e.g. speed limit is 60, so I can drive any speed from 0-60km [0,60] x ≤ 60	From word problems using real life situations, studetns will illustrate inequalities using visual representation. For example: a. X ≤ 60 b. X + 2 ≤ 62 c. 2x ≤ 120	Expositive / Individualistic	Teacher will explain the concept of inequality is e.g. speed limit is 60, so I can drive any speed from 0-60km [0,60] x ≤ 60	From word problems using real life situations, studetns will illustrate inequalities using visual representation. For example: a. X ≤ 60 b. X + 2 ≤ 62 c. 2x ≤ 120	Expositive / Individualistic	Teacher will explain the concept of inequality is e.g. speed limit is 60, so I can drive any speed from 0-60km [0,60] x ≤ 60	From word problems using real life situations, studetns will illustrate inequalities using visual representation. For example: a. X ≤ 60 b. X + 2 ≤ 62 c. 2x ≤ 120	Expositive / Individualistic
		Students will understand that Cartesian plots, tables of values and algebraic rules are all equivalent ways of representing the same mathematical relationship.	• Teacher will: - Ask students to think in real life examples of methods to locate people. - Introduce 'battle ships & cruiser' game and explains the use of the grid. • Teacher will explain convention of x and y axes (and graduations) and why they are used in mathematics (non scale for convenience).	• Students to give examples of methods of locating people/objects. • Students will work in pairs to draw up, or are given two grids each to play 'Battleships and Cruisers'	Associative / Performative	• Teacher will set an activity for students to use a range of tools such as GPS, Street Directories, atlas, orienteering maps etc. to locate different places and positions. • Teacher can also use yard or classroom to get students to follow directions. • Teacher will then discuss about what directions (variables) are involved with each.	• Students locate positions on given maps using directions (relationships between two variables) • Students work in the graphing, patterns and tables worksheets.	Individualistic/ Expositive	• Teacher will set an activity for students to use a range of tools such as GPS, Street Directories, atlas, orienteering maps etc. to locate different places and positions. • Teacher can also use yard or classroom to get students to follow directions. • Teacher will then discuss about what directions (variables) are involved with each.	• Students locate positions on given maps using directions (relationships between two variables) • Students work in the graphing, patterns and tables worksheets.	Individualistic/ Expositive
I	Use algebraic notation to represent and solve quantitative relation between dependent and independent variable. Find rational number as a point on the number line. Calculate using rational and real numbers. Use properties of arithmetic operations to generate equivalent expressions. Compare rational numbers and find prime factors. Calculate with integer exponents.	*Students will be able to solve linear equations such as 2x + 1 = 11.*	Teacher will model (personally, or by a video, a worksheet, a laboratory work description, etc) back tracking and provide opportunities for students to practice	Starting with simple equations (1 - 2 steps) students will move on to more advanced and more steps equations, practicing back tracking (understand inverse / opposites and the meaning of equal sign)	Individualistic / Expositive	Teacher will model (personally, or by a video, a worksheet, a laboratory work description, etc) back tracking and provide opportunities for students to practice	Starting with simple equations (1 - 2 steps) students will move on to more advanced and more steps equations, practicing back tracking (understand inverse / opposites and the meaning of equal sign)	Individualistic / Expositive	Teacher will model (personally, or by a video, a worksheet, a laboratory work description, etc) back tracking and provide opportunities for students to practice	Starting with simple equations (1 - 2 steps) students will move on to more advanced and more steps equations, practicing back tracking (understand inverse / opposites and the meaning of equal sign)	Individualistic / Expositive
		Students will be able to find the prime factors of a composite number.	Teacher will review the properties of Prime numbers, Composite Numbers and factors. Then, teacher will lead a discussion on factorisation, emphasising the key concepts.	*Resource:* Students complete various interactive tasks from eBook box 'Exploring Number'.	Individualistic / Expositive	Teacher will review the properties of Prime numbers, Composite Numbers and factors. Then, teacher will lead a discussion on factorisation, emphasising the key concepts.	*Resource:* Students complete various interactive tasks from eBook box 'Exploring Number'.	Individualistic / Expositive	Teacher will review the properties of Prime numbers, Composite Numbers and factors. Then, teacher will lead a discussion on factorisation, emphasising the key concepts.	*Resource:* Students complete various interactive tasks from eBook box 'Exploring Number'.	Individualistic / Expositive
		Students will be able to use exponent laws to multiply and divide exponential expressions, including numbers raised to the power of zero.	• Teacher will: - Explain expansion of index numbers into the usual number form. - Provide rationale for index laws (includes definition with explanation of value of any number to the power of 0). • Teacher will ask students to work in pairs to investigate examples of the use of index numbers in real life situations.	• Students will research two numbers that are 'usually' presented as exponent (index) numbers in real life situations, with their background usage. • Students will explore the meaning of powers by analysing real life examples of repeated multiplication of the same factor.	Associative / Investigative	• Teacher will: - Explain expansion of index numbers into the usual number form. - Provide rationale for index laws (includes definition with explanation of value of any number to the power of 0). • Teacher will provide students the opportunity to expand different index numbers and then investigate how index can be divided and multiplied.	• Students will expand a range of index numbers. • In groups students will analyse what is the simplest way to write the answer for divisions and multiplications involving index.	Associative / Investigative	• Teacher will: - Explain expansion of index numbers into the usual number form. - Provide rationale for index laws (includes definition with explanation of value of any number to the power of 0). • Teacher will provide students the opportunity to expand different index numbers and then investigate how index can be divided and multiplied.	• Students will expand a range of index numbers. • In groups students will analyse what is the simplest way to write the answer for divisions and multiplications involving index.	Associative / Investigative
J	Use linear equations and systems of linear equation to represent and solve both maths and real life problems. Generate tables, graphs, rules, expressions and equations to model real-world situation. Construct a function to model a linear relationship between two quantities. Classify function as linear or non-linear.	*Students will be able to analyse and intepret data in charts.*	Specialist teaching support recommended			Teacher will: • explain how to manually display data, using different graphs and their purposes • explore the concept of outliers and how outliers affects the mean and not the median	Students will individually use CAS calculators and computer programs (e.g. Excel) to design different kind of graphs (box plots, double column graphs etc). In groups, students will: • make decisions on type of data they want to collect and represent this in graphs • generate raw data using school context (height, reaction time, survey, census) • analyse and make inferences and interpret their data.	Investigative / Performative	Teacher will: • explain how to manually display data, using different graphs and their purposes • explore the concept of outliers and how outliers affects the mean and not the median	Students will individually use CAS calculators and computer programs (e.g. Excel) to design different kind of graphs (box plots, double column graphs etc). In groups, students will: • make decisions on type of data they want to collect and represent this in graphs • generate raw data using school context (height, reaction time, survey, census) • analyse and make inferences and interpret their data.	Investigative / Performative
		Students will be able to generate tables, graphs, rules, expressions and equations to model real world situations.				• Teacher will review key ideas of linear, quadratic and exponential functions. • Teacher will ask students to organise groups to record the use of different goods (water, electricity, etc.) at home and present the information collected, describing graphs to represent their data.	• Students to record the water consumption at home each 12 hours for 5 days. Measurements tabulated (time and reading with correct units). • Students to graph the above tables of results using suitable scales. Then draw a smooth or curved 'line of best fit', to show a graphical representation of their data.	Associative / Investigative	• Teacher will review key ideas of linear, quadratic and exponential functions. • Teacher will ask students to organise groups to record the use of different goods (water, electricity, etc.) at home and present the information collected, describing graphs to represent their data.	• Students to record the water consumption at home each 12 hours for 5 days. Measurements tabulated (time and reading with correct units). • Students to graph the above tables of results using suitable scales. Then draw a smooth or curved 'line of best fit', to show a graphical representation of their data.	Associative / Investigative
K	Generalize patterns using explicitly and recursively defined functions. Perform arithmetic operations on polynoms. Use factorisation to simplify quadratic equations. Analyse function using different representations. Extend properties of integer exponent to rational exponent		Specialist teaching support recommended				Immersing students in real-life examples such as research projects that investigates the uses of quadratic equations and the relationship between integer exponent and rational exponent	Investigative / Interrogative		Immersing students in real-life examples such as research projects that investigates the uses of quadratic equations and the relationship between integer exponent and rational exponent	Investigative / Interrogative
		Students will be able to factorise and solve quadratic equations using different methods.				• Teacher will: - Revise solving linear equations. - Demonstrate solution methods for quadratic equations (cross over method, algebraic formula and completion of square (if feel is necessary) • Teacher will give students the opportunity to assess different methods of solving quadratic equations.	Students complete revision worksheet - solving linear equations (ex: find x for the equation 5x + 1 = 2x – 6)	Individualistic / Expositive	• Teacher will: - Revise solving linear equations. - Demonstrate solution methods for quadratic equations (cross over method, algebraic formula and completion of square (if feel is necessary) • Teacher will give students the opportunity to assess different methods of solving quadratic equations.	Students complete revision worksheet - solving linear equations (ex: find x for the equation 5x + 1 = 2x – 6)	Individualistic / Expositive
L	Use polynomial identities' and properties of exponents to simplify algebraic expressions. Use exponential and logarithmic functions. Find function domain and intercepts with the axes, minimum, maximum and turning point. Calculate with exponential, polynomial, rational, logarithmic and periodic functions.	*Students will be able to find function domain and intercepts with the axes, minimum, maximum and turning point of a quadratic function.*	Specialist teaching support recommended			• Teacher will: - Revise Linear Equation graphing (Level J). - Revise factorisation of quadratic equations. - Introduce factorisation by completion of square or using formula. - Introduce standard parabola formula/shape. • Teacher introduces the worksheet with learning activities to students, explaining the tasks for students.	• Activities for students to physically manipulate materials to explore the concept of balancing, expanding or factorising. • Matching Activities to compare the expanded and the factorised versions of an algebraic expression. • Worksheet with different learning tasks.	Expositive Individualistic / Interrogative	• Teacher will: - Revise Linear Equation graphing (Level J). - Revise factorisation of quadratic equations. - Introduce factorisation by completion of square or using formula. - Introduce standard parabola formula/shape. • Teacher introduces the worksheet with learning activities to students, explaining the tasks for students.	• Activities for students to physically manipulate materials to explore the concept of balancing, expanding or factorising. • Matching Activities to compare the expanded and the factorised versions of an algebraic expression. • Worksheet with different learning tasks.	Expositive Individualistic / Interrogative