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| Strand: Number | | Topic: Number concepts |
| Foundation Level: Level statement  Students are developing a notion of counting and an awareness of number and money. Number names are becoming more meaningful. | | |
| Example learning outcomes  Students rote count to a specified number (e.g. 3, 5).  Students recognise numerals in their lives and environments.  Students recognise money in various forms. | | |
| Elaborations — To support investigations that emphasise thinking, reasoning and working mathematically | | |
| Students know:  counting uses numbers  numbers are useful  everyday language can represent quantities  numerals match quantities  the language of part/whole (e.g. some,  a piece of, all)  money is used as exchange for goods and services  money can have different forms — notes and coins, cash cards  everyday language that relates to the use of money. | Students may:  rote count forwards in various stages (e.g. to 5, 10 or 20) in familiar situations, such as finger play, songs, games, play, routines  recognise significant numbers (e.g. date of birth, age, house number, television channels, bus numbers)  point to numerals in and around the classroom (e.g. on the clock face, on posters, on identification tags on school bags)  recognise numbers that have communicative purposes (e.g. personal identification numbers (PINs), emergency and family phone numbers,  numbers for automatic dialling)  use everyday words, such as ‘lots of’, ‘heaps’ and ‘none’, to represent collections of familiar objects  distinguish numerals from letters  match small collections of objects to representations of numbers including calculator and electronic representations  match numerals and hand representations of small quantities to the same value of concrete objects (e.g. numeral 1 to one piece of fruit,  show two fingers or two hands to indicate the number of sandwiches to eat, numeral 2 to two counters)  match a numeral to pictures of a small number of objects (e.g. numeral 1 to a picture of one item)  recognise that numbers have a use (e.g. for identifying buses and houses, and for using in dates and games)  recognise that counting has a use (e.g. for checking the number of items in a container, sharing collections, providing a sequence for a routine  and in counting songs)  indicate that they want ‘all’, ‘some’, or ‘a piece’ of cake  participate in activities that involve parts of a whole (e.g. cutting a piece of string or partially filling a cup)  indicate when parts of pictures are missing or incorrectly placed  distinguish money from everyday objects of similar sizes and shapes  use everyday words for money, such as ‘cash’, ‘notes’, ‘coins’, appropriately  match coins and notes to real or pictorial representations of money  make use of access cards for different purposes (e.g. Medicare card, cash card, video card, pre-paid bus card, library card)  match various cards to familiar or real-life prompts (e.g. symbols, pictures, photographs of automatic teller machines (ATMs), buildings, shops  participate in routines associated with the use of cash cards to access cash or services (e.g. obtaining money from ATMs)  participate in routines associated with the use of Electronic Funds Transfer at Point of Sale (EFTPOS) to buy goods and services  participate in the purchase of goods and services using cash and vouchers. | |

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| Level 1: Level statement  Students are developing a sense of number by knowing number names and counting in sequence. They recognise, compare, order and represent small whole numbers and use concrete materials to explore the concept of parts of a whole. They are developing an awareness of the cost of goods and recognise and represent notes and coins.  Students identify and distinguish between situations that require them **to add or subtract, to share equally or to create equal groups.** | | |
| Core learning outcome: N 1.1  Students identify, compare and order small whole numbers, make and match representations of these numbers and identify coins, notes and their uses. | | |
| **Elaborations — To support investigations that emphasise thinking, reasoning and working mathematically** | | **Core content** |
| Students know:  number names  a number has a position relative to other numbers  how to count collections  how to identify the quantity of a collection  ways of representing numbers  how to match representations of numbers  how to compare and order small numbers  attributes of coins and notes  how to identify coins and notes  money is used in exchange for goods and services. | Students may:  identify and order numbers into the counting sequence  make and match representations of the counting sequence in different ways (e.g. on a blank number line, number line or hundred board)  identify the position of a number relative to other numbers and explain reasoning  identify the pattern of the counting sequence to count from any given number using different representations  identify the order of small numbers using a calculator to check or investigate different counting patterns  count from a given number using different representations of numbers (concrete, verbal, pictorial, symbolic)  make a collection and identify ‘how many’ in the collection  make collections of small numbers using one-to-one correspondence  make and match different representations of the same small number  make and order any representations of different small numbers  compare collections visually and estimate whether collections have the same number  describe ways of checking the closeness of an estimation by either counting or using subitisation (seeing a smaller group of items within a larger group)  identify and compare small numbers using a five frame or ten frame  make and match representations of small numbers using a five frame or ten frame  describe comparisons of quantities and numbers as being the ‘same’, ‘more’ or ‘less’ than each other and give reasons for judgments  explain ways to identify, compare and order small numbers  identify situations where a whole has been divided into portions and when part of a collection is identified (e.g. one biscuit from the tray in a packet)  compare and describe portions as ‘parts of a whole’ using the language of ‘part’, ‘slice’, ‘bit’ or ‘piece’  identify the different attributes of coins and notes  make and match representations of coins and notes to different representations of prices (e.g. price tags, advertisements)  use money in exchange for goods and services. | Numeration  whole numbers 0 to 10  number names 0 to 100  parts of a whole   * whole, part, slice, bit, piece   Number sense  conservation of number 0 to 10  position and order of numbers 0  to 10  different representations of numbers (concrete, verbal, pictorial, symbolic)  Money  goods and services have a purchase price  terms   * saving, spending, cost   attributes of coins and notes |
| At each level, investigations should occur in a range of contexts. For example, students could investigate:  the number of items needed to fill the shelves in a play shop  the combinations of items to fill sample bags to sell at school events  the number of players needed for activities or games  the exchange of money for goods and services, such as in a class shop or for class activities  allocation of numbers for particular purposes, such as queuing at the delicatessen or finding a seat on a plane  data collected to answer specific questions, such as favourite pets, food preferences or popular games. | | |

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| Level 2: Level statement  Students demonstrate their developing number sense by comparing, ordering and representing whole numbers to 999 and understanding that the value of a digit in a number determines its place. They understand that a whole can be made up of equal parts and use concrete materials to represent halves and quarters. When using money to purchase goods, they tender different combinations of notes and coins.  Students are beginning to recall or work out some addition, subtraction and multiplication number facts. They use a range of computation methods, including mental, written and calculator, to solve problems. | | |
| Core learning outcome: N 2.1  Students compare and order whole numbers to 999, make and match different representations and combinations of whole numbers and of equivalent amounts of money, and identify simple fractions of objects and collections. | | |
| **Elaborations — To support investigations that emphasise thinking, reasoning and working mathematically** | | **Core content** |
| Students know:  patterns of whole numbers  to 999  a number has a position relative to other numbers  the place value of each digit within a number  how to compare and order whole numbers  ways of representing numbers  ways of representing a number using different combinations of numbers  the language of equivalence  the value of coins and notes  how to make different representations of equivalent amounts of money  conventions for reading and recording dollars and cents  simple fractions  how to identify simple fractions of objects and collections. | Students may:  select a counting strategy appropriate for a given situation (e.g. counting in 2s to identify a house’s street number)  make different arrangements of objects or pictures to assist the count (e.g. in groups of twos, fives or tens)  represent the count in different ways (e.g. on a five frame or a ten frame, blank number line, hundred board or number line)  identify the pattern of the counting sequence to count from any given number  extend the counting sequence to number names for decades and hundreds  make and match different representations of each decade and hundred  extend the counting sequence to number names within each decade and hundred  identify the position of a number relative to other numbers  use the position of a number (relative to other numbers) to describe how to locate that number on a different representation  describe similarities and differences when the same counting pattern is used with larger numbers  compare numbers to identify and explain similarities and differences between them (e.g. their number names, position relative to other numbers, order in the counting sequence, the quantity each represents and value of each of the digits)  make and describe different combinations of the same number using place value  identify and describe subsets of numbers (odd and even)  compare numbers to identify those ‘greater than’, ‘smaller than’ or ‘of the same value’  use known numbers to assist when ordering numbers on a blank number line  give reasons to justify the order  count the number of equal parts of a whole that has been divided into halves and quarters  name two equal parts of a whole or a collection as ‘halves’, and four equal parts of a whole or collection  as ‘quarters’  identify and explain ways to represent a half and a quarter of a whole  identify and explain ways to represent a half and quarter of a collection  identify the number of fold lines required to make halves and quarters  compare the number of fold lines with the number of equal parts  identify ways to check that the parts of a collection or whole are equal  make different combinations of coins and notes to match displayed prices  make different combinations of cash to the same amount to pay for goods or services  read and record prices in dollars and cents  explain that change is given when too much money is tendered for purchases. | Numeration  whole numbers to 99, then to 999  place value to hundreds  equals (=), does not equal (≠)  fractions in context   * equal parts of a whole * half (1 part out of 2 equal parts) * quarter (1 part out of 4 equal parts)   Number sense  conservation of number (whole numbers)  position and order of numbers   * relationships between numbers   different representations of numbers  subsets of whole numbers   * odd and even   Money  goods and services have a purchase price   * tendering cash for purchases   equivalent values  conventions   * reading and recording dollars  and cents |
| **At each level, investigations should occur in a range of contexts. For example, students could investigate:**  illustrations of large numbers, such as the number of windows in skyscrapers  the numbers of insects in colonies  profiles of numbers — listing what is known about a specific number and finding out more  community use of numbers, such as house numbers or numbers in advertisements  page number references for research purposes  different ways in which numbers are represented in games and puzzles, such as cards or dominoes  combinations of notes and coins to pay for goods or services in a class shop or enterprise  advertised prices for a desired item to identify highest and lowest prices  how to share collections between two or four equal groups  ways of folding paper to create decorations or paper sculptures. | | |

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| Level 3: Level statement  Students compare, order and represent whole numbers to 9 999, common and decimal fractions and recognise the value of each digit. They tender appropriate amounts of money for cash transactions and identify other methods of paying for goods and services.  Students recall or work out all addition, subtraction and multiplication number facts and some division facts. They use a range of computation methods, including mental, written and calculator, to solve problems that involve whole numbers and decimal fractions in context. | | |
| Core learning outcome: N 3.1  Students compare, order and represent whole numbers to 9 999 and common and decimal fractions, calculate cash transactions and describe other methods of payment. | | |
| **Elaborations — To support investigations that emphasise thinking, reasoning and working mathematically** | | **Core content** |
| Students know:  patterns of whole numbers to  9 999  patterns of common and decimal fractions  similarities and differences in patterns of whole numbers and common and decimal fractions  the place value of each digit within a whole number and decimal fraction  whole numbers and common and decimal fractions have positions relative to other numbers  how to compare and order whole numbers and common and decimal fractions  ways of representing whole numbers and common and decimal fractions  the same whole number or common or decimal fraction can be represented using different combinations of smaller numbers  parts of a whole can be represented as common or decimal fractions  mental computation strategies and computation methods to calculate cash transactions  conventions for reading, recording and rounding dollars and cents  methods of payment. | Students may:  identify patterns when counting forwards and backwards from any number using a range of counting strategies (e.g. by 50s, 200s, 1 000s)  identify or represent the counting patterns on number charts, number lines and calculators  explain similarities and differences among counting patterns and extensions of counting patterns  record whole numbers and common or decimal fractions in different ways, including on a blank number line  order numbers, including whole numbers and common and decimal fractions, by identifying the position of numbers relative to other numbers and explain reasoning  compare and order various representations of equal parts of a whole  compare and order whole numbers, and common and decimal fractions, and use symbols to indicate whether numbers are ‘greater than’, ‘equal to’ or ‘less than’ other numbers  represent whole numbers and common and decimal fractions on a number line and explain which are ‘greater than’, ‘equal to’ or ‘less than’ others  represent a whole number and decimal fraction in different ways, including on calculators  compare and describe the value of digits in different places in whole numbers and in decimal fractions  explain similarities and differences between the place value of whole numbers and the place value of decimal fractions  represent and record regroupings of whole numbers, and regroupings of common and decimal fractions, in different ways  use place value to identify and explain regroupings of the same number  use alternative methods to check the value of the regroupings, such as calculators or written computation  identify and describe subsets of whole numbers (multiples and factors)  identify and describe common fractions and decimal fractions used in various situations  identify links between common fractions and decimal fractions  explain the position of a fraction relative to a whole and relative to other fractions and give reasons for the judgment e.g. ‘I’d put 1¾ between 1 and 2 on a number line because it is bigger than 1 but smaller than 2’  interpret amounts of money represented in a variety of ways  compare, order and match different combinations of amounts of cash  calculate the total cost of items rounding totals as required  identify whether a specified amount of money is ‘enough’ or ‘not enough’ for purchases  tender amounts of money to cover costs  estimate or calculate change  record amounts of money as required using conventions e.g. 96c or $0.96  identify and explain a variety of payment methods for cashless transactions. | Numeration  whole numbers to 9 999  decimal fractions in context   * tenths, hundredths   place value from thousands to hundredths  greater than (>), equal to (=),  less than (<)  fractions in context   * equal parts of a whole * common fraction format * decimal fraction format   Number sense  conservation of number (whole numbers, decimal and common fractions)  position and order of numbers   * relationships between numbers * sensible adjustments of numbers   different representations of numbers  subsets of whole numbers   * multiples * factors   Money  cash transactions  cashless transactions (e.g. EFTPOS, prepaid cards, accounts)  equivalent values  conventions   * reading * recording * rounding totals for cash purchases   change |
| **At each level, investigations should occur in a range of contexts. For example, students could investigate:**   * number of spectators at an event * advertised prices for electronic games or toys to make comparisons * distances between geographical locations * holiday deals * ways that amounts of ingredients for cooking can be represented * ways measurements of fabric, craft or building materials for construction projects can be represented and compared * results in field events, such as long jump (metres and centimetres) * ways of creating equal groups of students for sports activities or for performances * rounding totals for cash purchases of items to stay within a specified budget * combinations of notes and coins that could be used when giving change * different methods of payment for electricity or telephone accounts. | | |

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| Level 4: Level statement  Students compare and order whole numbers and common and decimal fractions. They identify fractions expressed in different ways and make connections between common fractions, decimal fractions and percentages. They identify a range of factors such as advertising, discounts and methods of payment that may influence financial decisions.  Students recall all addition, subtraction, multiplication and division number facts. They use a range of computation methods to solve problems that involve whole numbers, common and decimal fractions, percentages and rates. | | |
| Core learning outcome: N 4.1  Students compare and order whole numbers and common and decimal fractions of any size, make connections between key percentages and fractions, and describe how a range of factors influence financial decisions. | | |
| **Elaborations — To support investigations that emphasise thinking, reasoning and working mathematically** | | **Core content** |
| Students know:  patterns of whole numbers  patterns of common and decimal fractions  similarities and differences in patterns of whole numbers and patterns of common and decimal fractions  the place value of each digit within a whole number and decimal fraction  whole numbers and common and decimal fractions have positions relative to other numbers  how to compare and order whole numbers and common and decimal fractions of any size  percentage is a fraction based on hundredths of a whole or parts out of 100  key percentages  connections between common or decimal fractions and percentages  how to represent common and decimal fractions as percentages and vice versa  the need for financial decisions  factors that influence financial decisions  how a range of factors influence financial decisions. | Students may:  identify and interpret common and decimal fraction formats  explain the relationship between common fractions and division  identify equivalence between common fractions  identify common fractions, improper fractions, decimal fractions and mixed numbers that are equivalent  locate and compare the position of whole numbers and common or decimal fractions on a number line or blank number line and give reasons for the placement  develop referents for common fractions (e.g. knowing ¾ is between ½ and 1, 7/8 and 9/10 are close to 1)  use symbols to identify whether common or decimal fractions are ‘greater than’, ‘equal to’ or ‘less than’ other fractions  identify and explain why an infinite range of fractions can be placed between any two numbers  make sensible adjustments of numbers as required  apply and explain the use of square and cubic notation in problem situations, such as in measurement contexts involving area or volume  identify patterns and compare the size of whole numbers and decimal fractions and the value of digits in different places  compare and order whole numbers and decimal fractions using place value  use everyday representations, such as 1.5 m (1 500 000)  identify and explain regroupings of the same number  represent and record regroupings in a variety of ways  identify and describe subsets of whole numbers, including prime, composite, square and triangular numbers  explain percentage as a fraction of 100 and represent using percentage symbol  identify and explain connections between percentages and their equivalent representations expressed  as hundredths  match and explain connections between key percentages, and common and decimal fractions  select and use connections between key percentages and fractions to assist in solving problems  compare key percentages and common and decimal fractions, such as ¼, 0.25 and 25%, and determine whether one is ‘more than’, ‘less than’ or the ‘same as’ another  order the percentages and fractions in different ways such as in ascending and descending order  e.g. 25%, ½ , 0.75  list and describe the factors influencing financial decisions  interpret factors and identify unavoidable costs  identify factors that impact on potential income, savings or costs  explain advantages and disadvantages associated with various factors  determine potential income, savings or costs  explain the importance of careful budgeting  conduct market research to confirm or refute speculations  make financial decisions based on understandings of best buys, discounts, methods of payment. | **Numeration**  whole numbers  decimal fractions  key percentages (100%, 50%, 25%, 20%, 10%,1%)  fractions   * common fractions format * terms (vinculum, numerator, denominator) * decimal fractions format * percentage format * equivalence   square and cubic notation  Number sense  position and order of numbers   * relationships between numbers * sensible adjustments of numbers   connections between key percentages, unit fractions and decimal fractions  everyday representations of numbers (e.g. 20K/20 000, $1.5m/$1.5 million, $3b/$3 billion)  subsets of numbers   * prime and composite * square * triangular   Money  financial decisions   * purchases (best buys, discounts) * advertising (for purchases) * methods of payment * budgets for specific events   key percentages   * simple interest * discounts   cashless transactions  (e.g. cheques, money orders, EFTPOS, store cards) |
| At each level, investigations should occur in a range of contexts. For example, students could investigate:  populations and debts of selected countries  various quantities needed for different recipes  the sizes of different scale models  living standards in different countries according to employment rates, mortality rates versus birth rates, etcetra  sporting performances based on player statistics  media claims on social issues  opinion polls  class enterprises, such as a stall at the fete or a class musical  development and marketing of products  how different bank accounts operate  best buys using advertising materials. | | |

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| Level 5: Level statement  Students compare and order positive and negative integers and explain and record index notation. They interpret and use conventions for expressing rates and ratios. They identify  methods of saving and investigate the factors affecting debit and credit transactions. They understand that the purchase of goods and services may attract fees or charges.  Students use a range of computation methods to solve problems that involve positive rational numbers, rates, ratios and direct proportions. | | |
| Core learning outcome: N 5.1  Students compare and order integers, use and interpret index notation, rates and ratios, and analyse options to make informed financial decisions about saving, credit and debit. | | |
| **Elaborations — To support investigations that emphasise thinking, reasoning and working mathematically** | | **Core content** |
| Students know:  integers represent positive and negative whole numbers  integers have a position relative to other numbers on a number line  how to compare and order integers  index notation is a way of representing numbers  how to use and interpret index notation  rates and ratios represent relationships between quantities  how to use and interpret rates and ratios  how to analyse financial options  the relevance of and need for financial decisions  factors that influence financial decisions about savings, credit and debit  how to make informed financial decisions about savings, credit and debit. | Students may:  position integers on a number line  compare and order integers  record integers using conventions  analyse the relative distances between integers on a number line and explain how integers are added and subtracted  identify and describe patterns using square, cube and exponential numbers (e.g. refer to formulae for measurement of regular shapes)  identify square root as the inverse of squaring  rewrite equivalent forms, such as side times side and S2  explain ‘rate’ as being the relationship between ‘unlike’ quantities  use conventions for recording rates for different situations  use rate to calculate quantities, such as the cost of a number of items or the cost per item given the total cost of a number of items  explain ‘ratio’ as being the relationship between ‘like’ quantities  use conventions for recording ratios for different situations  use ratio to calculate quantities  compare and contrast financial options, such as fees and charges on credit and debit transactions, different saving methods, financial transactions involving discounts or lay-bys  determine and explain short-term benefits and/or long-term consequences of financial decisions. | **Numeration**  integers  index notation (whole number indices only)  square root  percentage   * whole percentages (e.g. 65%, 110%) * fractional (e.g. 6.5%, 12½%) * greater than 100%   Number sense  position and order of numbers including integers   * relationships between numbers * sensible adjustments of numbers   connections between squares and square roots  connections between percentages and fractions  Money  financial decisions   * credit and debit transactions * charges/fees (including GST) * advertising (of financial services) * short-term benefits and/or  long-term consequences * methods of saving   cashless transactions (e.g. direct debit, BPAY)  percentages   * interest * discounts |
| **At each level, investigations should occur in a range of contexts. For example, students could investigate:**  temperatures from a range of locations, including outer space  area and volume calculations when constructing and renovating  fruit, vegetables and groceries items that represent best value for money  the amount of catering materials required for varying numbers of people  ratio between similar triangles  relationships between quantities on graphs  mobile phone plans  relationship between diameter and circumference of circle  scale for plans and maps  financial transactions involving profit and loss or bank balance  savings associated with a part-time job  interest rates  factors to be considered when opening a savings account, such as interest rates, fees, number of free transactions  plans and budgets for personal shopping. | | |

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| Level 6: Level statement  Students compare and order rational numbers and use scientific notation as a short-hand method of representing very large or very small numbers. They develop personal plans, consider financial options and monitor financial situations using available information.  Students use a range of computation methods and strategies to solve problems that involve rational numbers, rates, ratios and direct and inverse proportions. | | |
| Core learning outcome: N 6.1  Students compare and order rational numbers, interpret and use scientific notation and analyse options to make informed personal budgeting and other financial decisions. | | |
| **Elaborations — To support investigations that emphasise thinking, reasoning and working mathematically** | | **Core content** |
| Students know:  rational numbers include whole numbers, fractions and integers  how to compare and order rational numbers  scientific notation can represent rational numbers  how to interpret and use scientific notation  how to analyse financial options  factors that influence personal budgeting decisions  how to make informed personal budgeting and other financial decisions. | Students may:  explain rational numbers as being numbers that can be represented in the form a/b, where a and b are integers and b is not 0  identify and describe scientific notation as representations of very small and very large rational numbers using negative and positive indices  interpret scientific notation and other representations of number, such as calculator representations involving powers of 10  position rational numbers on a number line  record rational numbers using conventions  compare and order rational numbers  analyse the relative distances between rational numbers on the number line  calculate using sensible adjustments of numbers  analyse the advantages and disadvantages of solutions to financial issues  use the analyses of options to justify financial decisions. | Numeration  rational numbers  index notation (integer indices)  scientific notation (positive and negative powers of 10)  Number sense  position and order within the set of rational numbers   * sensible adjustments of numbers   connections between scientific notation and other representations of numbers  Money  financial decisions and budgeting   * income (gross, net) * expenditure * saving for a purpose * borrowing * savings plan * planning for an event * consequences of over-commitment   percentages   * compound growth   cashless transactions (e.g. internet and phone banking)  comparisons of rates, fees and charges |
| At each level, investigations should occur in a range of contexts. For example, students could investigate:  distances in outer space  microscopic representations  water quality  molar concentrations in chemistry  financial records, such as ledger entries, bank statements, personal budgets  plans and budgets, such as for a school dance, party, holiday trip  purchase of personal items of a substantial cost and goal setting  different financial scenarios, such as income, expenditure, savings plans  interest rates involving compound growth  payment plans  consequences of over-commitment  fees and charges on credit and debit transactions  analysing short-term and/or long-term benefits and consequences of financial decisions. | | |