Senior Years
Literacy, Academics, and Language (LAL)
Foundational Numeracy Courses

Phase 1A—Half-Course Credit

LAL Numeracy Phase 1A: **Number: Counting**

Big Ideas: Counting tells how much or how many.

	Numeracy	Language
Outcomes **KN5, 1N1, 1N3, 2N1, 3N1**	Develop early number sense by attaching meaning to counting: ■ Say, read, and write number sequences between two given numbers, forward and backward, 1–30. ■ Skip-count by 2s and 10s between two given numbers from 0 to 30. ■ Skip-count by 5s, 3s, and 4s using multiples of the number from 0 to 30. ■ Understand each object counted must be touched or "included" once as the numbers are said (one-to-one-correspondence). ■ Understand the last number said in a count tells "how many" in a collection (cardinality). ■ Understand the arrangement of the objects does not affect how many there are (conservation). ■ Identify the number that is one more, two more, one less, and two less than a given number up to 30.	■ Listen to and understand simple words, phrases, or simple sentences, with or without visual aids such as physical movement, gestures, realia, and pictures. ■ Express simple ideas using keywords, short phrases, and short sentences in structured, familiar situations. ■ Use visuals, realia, and their first language to begin to add basic knowledge, concepts, and skills related to the core subject areas. ■ Respond appropriately to basic personal questions and engage in short classroom or social interactions, using phrases or simple sentences; indicate understanding or lack of understanding with gestures or short phrases. ■ Use basic cognitive strategies, with guidance and support, to enhance language learning (e.g., learn new words, etc.).
Connection to Prior Learning	Count from 1 to 10. ■ Say the number sequence by 1s starting anywhere from 1 to 10 and 10 to 1.	Know and use the basic elements of the sound-symbol system in order to do the following: ■ Sound out numbers using simple sentences. ■ Follow directions of single words and gestures. ■ Demonstrate and explain orally how to count up to 30. ■ Relate numbers from other cultures/languages to the English system. ■ Count realia in the school/classroom (e.g., students, supplies, books, classrooms, etc.).
	Instructional Strategies: ■ Provide many opportunities for students to practise counting using a variety of everyday items by 1s (forward and backward) and skip-counting. ■ Use hundred charts ■ Use number lines (start with number cards on a clothesline). ■ Use manipulatives, visual representations and symbols, and coins to teach counting. ■ Use manipulatives and coins to count groups (count by steps) and do collections. ■ Conduct subitizing activities. ■ Create number cards (in English numerals, words, and in L1) to represent numbers. ■ Provide students with lots of opportunities to count—concrete and visual supports such as pencils, fingers, number of ears in the room, etc. ■ Use one-to-one correspondence strategies such as *By the Numbers*, a one-to-one correspondence game (Essdack). ■ Use manipulatives, visual representations, and symbols to demonstrate one-to-one correspondence. ■ Have students create a number line to indicate one-to-one correspondence.	**Assessment Criteria:** ■ Count forward and backward by 1s the number sequence between two given numbers (0 to 100). ■ Display a set of counters (start with up to 10 and then expand)—say, for example, number of fingers. ■ Print numbers when represented orally in a sequence (e.g., 1, 2, 3, 4, … or 3, 6, 9, …). ■ Print numbers when represented orally or on a number line in a random order. ■ Count objects and observe one-to-one correspondence, cardinality, and conservation. ■ Observe that students relate number to quantity or that numbers can be used in ways that do not refer to quantity (ordinal numbers, bar codes, telephone numbers, house numbers, etc.). ■ Read a numeral (0 to 100) when it is presented symbolically. ■ Skip-count by 2s, 5s, and 10s starting at 0. ■ Identify and correct errors and omissions in a number sequence. ■ Determine the value of a set of coins (nickels, dimes, quarters, loonies) by using skip-counting.

LAL Numeracy Phase 1A: **Number: Counting** *(continued)*

Learning Experiences

Language Foundation:

- Explicitly teach classroom direction words (such as *read*, *print*, *show*, etc.) and phrasal verbs (e.g., *pick up*, *hand in*, *look over*, etc.).
- Expose students to grade-level vocabulary as well as the simpler language (e.g., next to *How many*, also write *Count*).
- Be aware of confusing numbers (such as 12 and 21, 15 and 50 or 51, etc.).
- Use examples from the classroom and around the school to reinforce vocabulary.
- Promote dialogue with students thinking and working in pairs or groups.
- Encourage students to use key vocabulary, either in their L1 or English.
- Use age-appropriate vocabulary and examples.

Key Vocabulary:

- How many
- Count
- Number
- From
- By
- Skip-count
- Up to
- Forward
- Backward
- Next
- Before
- After
- Digit
- Multiples

Sentence Frames:

- The number is _____.
- Counting by _____ starting at _____ is _____.
- I can show this _____ (number) with _____.
- Starting at _____, I can count (up/down/forward/backward) by _____, _____, _____, _____.

Learning Supports:

- Open and labelled number line
- Word wall
- Math journal
- Pictures and graphics
- Tens frame
- Decks of cards
- Dice
- Hundred chart
- Games involving counting (*I have …, who has …?*)
- Board and dice games
- Translating apps (*Google Translate*, *iTranslate*, *Microsoft Translate*, etc.)
- See “What is Subitizing?” (www.pre-kpages.com/subitizing/) at Pre-Kpages.com

Mental Math:

- Fill in missing spaces in a hundred chart.
- Fill in missing spaces on a number line.
- Demonstrate skip-counting concretely, pictorially, and symbolically.
- Subitize activities.

Problem Solving:

- How many pencils do we have?
- How many pencils do we need for all students to have one pencil each?
- How many pencils do we need for all students to have two pencils each?
- How many loonies are there in this container?

LAL Numeracy Phase 1A: **Number: Representation of Whole Numbers**

Big Ideas: Quantities can be represented concretely, pictorially, and symbolically. There are different but equivalent representations of numbers. Our number system is based on patterns (place value). The position of a digit in a number determines the quantity it represents.

	Numeracy	Language

Outcomes
1N1, 1N7, 2N1, 3N1, 1N4, 2N4, 3N2, 3N5
	■ Develop number sense through counting more efficiently:
	  ■ Say, read, and write number sequences between two given numbers, forward and backward 1– 00, then to 1000.
	  ■ Skip-count by 2s and 10s between two given numbers from 1 to 100, then to 1000.
	  ■ Skip-count by 5s, 3s, and 4s using multiples of the number from 1 to 100.
	  ■ Understand that the patterns in the way we say and write numbers help us to remember their order.
	■ Compare and order numbers to 100 and then to 1000.
	■ Estimate quantities less than 1000 using benchmark numbers such as, but not limited to, 50s, 100s, and 500s.
	■ Illustrate concretely and pictorially the meaning of place value for numerals to 1000.
		■ Listen to and understand simple words, phrases, or sentences, with or without visual aids such as physical movement, gestures, realia, and pictures.
		■ Express simple ideas using keywords, short phrases, and short sentences in structured, familiar situations, with or without visual aids.
		■ Use visuals, realia, and their first language to begin to add basic knowledge, concepts, and skills related to the core subject areas.
		■ Respond appropriately to basic personal questions and engage in short classroom or social interactions, using phrases or simple sentences; indicate understanding or lack of understanding with gestures or short phrases.
		■ Use basic cognitive strategies, with guidance and support, to enhance language learning (e.g., memorize new words, etc.).

Connection to Prior Learning	■ Understand that each counted object must be touched or “included” once as the numbers are said (one-to-one correspondence). ■ Say, read, and write number sequences between given numbers, forward and backward, 1–30. ■ Understand that the last number said in a count tells “how many” in a collection (cardinality). ■ Understand that the arrangement of the objects does not affect how many there are (conservation).	Know and use emergent repertoires of words and phrases to do the following: ■ State the numbers before and after a given number using a number line. ■ Determine which set of objects is bigger or smaller orally, using manipulatives, and print the corresponding numbers in L1 and in English. ■ Relate numbers from other cultures/languages to the English system. ■ Count realia in the school/classroom (e.g., students, supplies, books, etc.). ■ Compare nickels, dimes, quarters, and loonies, represented in cents. ■ Relate numbers from other cultures/languages to the English system. ■ Using place values, compare the amounts of two different currencies as to which one has a larger value.
	Instructional Strategies: ■ Use varied number charts to understand the patterns in our numeration system. ■ Understand and use the cyclical patterns in whole numbers. ■ Represent numbers to 1000 in standard, expanded, and word form. ■ Use the constant feature on a calculator to predict and generate numbers. ■ Make odometers with students by placing the numbers 0–9 vertically on a piece of paper. Discuss with students the pattern of the number sequence. Ask questions such as, “What happens after each 9?”, “What number is after 99, 109, 1 099?”. ■ Compare how we say numbers to how students could say them in their first language. ■ Investigate how a collection of items can be broken into parts.	**Assessment Criteria:** Use keywords, short phrases, and short sentences to do the following: ■ Order, in print and/or orally, a set of given numbers. ■ Say and write numbers that come before, after, next to, or between a given number(s). ■ Represent a number in different ways and explain how they are equivalent, concretely, using base-10 blocks, pictorially using tally charts, and symbolically (e.g., 351 can be represented as three 100s, five 10s and one 1, or as two 100s, fifteen 10s, and one 1, or as three 100s, four 10s, and eleven 1s). ■ Explain, and show with counters, the meaning of each digit for a 3-digit numeral with all digits the same (e.g., for the numeral 222, the first digit represents two hundreds [two hundred counters], the second digit represents two tens [twenty counters], and the third digit represents two ones [two counters]).

LAL Numeracy Phase 1A: **Number: Representation of Whole Numbers** *(continued)*

Instructional Strategies: *(continued)*

- Flash different quantities of items to students and ask them to say how many without counting one-to-one.
- Use ten frames and ask students how many they see and how they see it.
- Use a 100 grid to have students decompose 100 in different ways.
- Use Base-10 blocks to show all the regular (56 is 5 tens, 6 ones) and irregular (56 is 4 tens and 16 ones) place value notations.
- In your daily routine, you may use the "Number of the Day" strategy to develop and observe students' different representations of numbers.
- Using manipulatives, create a number and identify its place value.
- Identify the units, tens, hundreds, and thousands digit of a given number.
- Demonstrate place value by using activities such as *Race to 100*, dice games, Base-10 block games/activities; create largest and smallest numbers using 3 or 4 digits.

Learning Experiences

Language Foundation:

- Demonstrate understanding that *decompose* a number means breaking it up into parts.
- Show that *expand* means to get bigger.
- Demonstrate an understanding that each digit of a number has a different value.

Key Vocabulary:

- Place value
- Ones
- Tens
- Hundreds
- Thousands
- Together
- Expanded form
- Standard form
- Word form

Sentence Frames:

- The number _____ can be written as _____.
- For the number 3728,
  _____ is the ones place digit.
  _____ is the tens place digit.
  _____ is the hundreds place digit.
  _____ is the thousands place digit.
- Decomposing _____ can be represented as _____ 100s, _____ 10s, and _____ ones.

Learning Supports:

- Hundred chart
- Base-10 blocks
- Tens frame
- Place-value charts
- Place-value cards

Mental Math:

- Identify digits and their place value.
- Decompose a number and write it in the expanded form (3000 + 600 + 50 + 9).
- Given a number in expanded form, have students write the number in a standard form.

Problem Solving:

- What is the distance from Vancouver to Winnipeg? What is the distance from Toronto to Winnipeg? Which city is closer? Explain using place values.
- Given two, three, or four number cards, create the largest and the smallest value number.

LAL Numeracy Phase 1A: **Number: Representation of Whole Numbers**

Big Ideas: Quantities can be represented concretely, pictorially, and symbolically. Classifying numbers provides information about their characteristics.

	Numeracy	Language
Outcomes **2N2, 2N3**	Develop an awareness of number characteristics: ■ Demonstrate whether a number is even or odd. ■ Describe order or relative position using ordinal numbers.	■ Listen to and understand simple words, phrases, or simple sentences with or without visual aids such as physical movement, gestures, realia, and pictures. ■ Express simple ideas using keywords, short phrases, and short sentences in structured, familiar situations, with or without visual aids. ■ Use visuals, realia, and their first language to begin to add basic knowledge, concepts, and skills related to the core subject areas. ■ Respond appropriately to basic personal questions and engage in short classroom or social interactions, using phrases or simple sentences; indicate understanding or lack of understanding with gestures or short phrases. ■ Use basic cognitive strategies, with guidance and support, to enhance language learning (e.g., memorize new words, etc.).
Connection to Prior Learning	■ Say, read, and write numbers to 1000. ■ Have some understanding of place value.	Using keywords, express ideas by doing the following: ■ Using a number line, state whether the number before and after a given number is an even or odd number. ■ Determine which set of objects is odd or even orally and by using manipulatives, and print the corresponding numbers in L1 and in English. ■ Relate odd and even numbers from other cultures/languages to the English system. ■ Count realia in the school/classroom (e.g., students, supplies, books, girls, boys, etc.), and classify them as even or odd numbers. ■ Pair objects and determine whether they are even or odd. ■ Subitize to determine odd or even numbers. ■ Sort a set of numbers by whether they are even or odd.

	Instructional Strategies:
	■ Using manipulatives, start with a given number of samples of an object and select them two at a time. If there are no objects left, it is an even number; if there is one object left, it is an odd number.
	■ Extend the pattern to bigger numbers.
	■ Identify the ones digit of a given number, noting the following:
	  ■ If it is a 0, 2, 4, 6, or 8, then it is an even number.
	  ■ If it is a 1, 3, 5, 7, or 9, then it is an odd number
	■ Have students line up and decide which student is first, second, third, fourth....
	■ Ask students to make an ordered list of jobs they need to do for school.
	■ Solve problems using ordinal numbers.
		Assessment Criteria:
		Using keywords, short phrases, and short sentences, assess whether the student can do the following:
		■ Determine whether a number is even or odd by using concrete materials or pictorial representations.
		■ Identify even and odd numbers in a sequence, such as in a hundred chart.
		■ Sort a set of numbers into even and odd.
		■ Indicate the position of an object in a sequence by using ordinal numbers.
		■ Compare the relative position of an object in two different sequences.

LAL Numeracy Phase 1A: **Number: Representation of Whole Numbers** *(continued)*

Learning Experiences

Language Foundation:

- Explain how to determine whether a number is even or odd.
- Discuss the difference between *even* and *odd*, as well as the last digit or the units digit.
- Use age-appropriate vocabulary and examples.

Key Vocabulary:

- Even
- Odd
- Units/ones digit
- First and last digit
- Ends in
- Pair

Sentence Frames:

- _____ is equal to _____.
- _____ is (odd/even) because it ends in a _____.
- When I identify pairs of _____ (object), there is _____ left over so the number is _____ (odd/even).

Learning Supports:

- Coloured counters
- Decks of cards
- Various games such as *Mancala*, *NIM*, backgammon, *Snakes and Ladders*, *Race to One Hundred*
- Number line
- Hundred chart
- Calendar

Mental Math:

- Identify odd and even numbers.
- Place this set of numbers in increasing and then in decreasing order:
  a) {24, 8, 17, 3}
  b) {952, 236, 100, 750}
- Using benchmarks, estimate the placement of this set of numbers on a number line:
  a) {24, 8, 17, 3}
  b) {952, 236, 100, 750}

Problem Solving:

- If you want to make equal teams, explain if you will need an even or odd number of students.
- There are 24 students in a class. If you divide them into 2 teams, how many students will be left over?

LAL Numeracy Phase 1A: **Number: Addition and Subtraction with Whole Numbers**

Big Ideas: The four operations are intrinsically related. Flexible methods of calculation require a strong understanding of operations and properties of the operation. There are a variety of ways to estimate sums, differences, products, and quotients.

	Numeracy	Language

Outcomes
1N9, 2N8, 2N9, 3N6, 3N7, 3N8, 3N9
	Develop number sense:
	■ Describe meanings of addition as "joining" and "part-part-whole."
	■ Describe meanings of subtraction as "taking away," "comparing (or difference)," and "whole-part-part."
	■ Demonstrate an understanding of addition and subtraction of numbers with answers to 1000 (limited to 1-, 2-, and 3-digit numerals) by
	  ■ using personal strategies for adding and subtracting with and without the support of manipulatives
	  ■ creating and solving problems in contexts that involve addition and subtraction of numbers, concretely, pictorially, and symbolically
	■ Apply estimation strategies to predict sums and differences of two 2-digit numerals.
	■ Show that addition and subtraction are inverse operations.
	■ Understand the effect of adding and subtracting zero to and from a number.
	■ Demonstrate an understanding of equality concretely, pictorially, and symbolically.
		■ Listen to and understand simple words, phrases, or simple sentences, with or without visual aids such as physical movement, gestures, realia, and pictures.
		■ Express simple ideas using keywords, short phrases, and short sentences in structured, familiar situations, with or without visual aids.
		■ Use visuals, realia, and their first language to begin to add basic knowledge, concepts, and skills related to the core subject areas.
		■ Respond appropriately to basic personal questions and engage in short classroom or social interactions, using phrases or simple sentences; indicate understanding or lack of understanding with gestures or short phrases.
		■ Use basic cognitive strategies, with guidance and support, to enhance language learning (e.g., memorize new words, etc.).

Connection to Prior Learning	■ Represent and describe numbers to 1000, concretely, pictorially, and symbolically. ■ Count forwards and backwards from a starting point by 2s, 3s, 5s, and 10s. ■ Using benchmarks, estimate the placement of a set of numbers on a number line.	■ Write solutions to addition and subtraction questions using an equals sign. ■ Demonstrate the result when zero is added or taken away from a number. ■ Derive and explain an estimate of an addition and a subtraction computation.

	Instructional Strategies:
	■ Counting on
	■ Counting back
	■ One more
	■ One less
	■ Making 10
	■ Using benchmarks and friendly numbers
	■ Building on known doubles
	■ Using part-part-whole relationships for addition
	■ Using whole-part-part relationships for subtraction
	■ Estimate, strategy:
	  ■ Example: 34 + 251 using benchmarks of 100, this can be written as: 0 + 300
	  Estimate is: 300
	  ■ Example: 34 + 251 using benchmarks of 10, this can be written as: 30 + 250
	  Estimate is: 280
		Assessment Criteria:
		■ Model the addition of two or more numbers using concrete or visual representations, and record the process symbolically.
		■ Model the subtraction of two numbers using concrete or visual representations, and record the process symbolically.
		■ Create an addition or subtraction story problem for a solution.
		■ Determine the sum of two numbers using a personal strategy (e.g., for 326 + 48, record 300 + 60 + 14).
		■ Determine the difference of two numbers using a personal strategy (e.g., for 127 − 38, record 38 + 2 + 80 + 7 or 127 − 20 − 10 − 8).
		■ Solve a problem involving the sum or difference of two numbers.

LAL Numeracy Phase 1A: **Number: Addition and Subtraction with Whole Numbers** *(continued)*

Learning Experiences

Language Foundation:

- Value vocabulary.
- Describe calculations using place value.
- Explain the process of adding and subtracting two numbers.
- Discuss how addition and subtraction are related.
- Describe similarities and differences between groups of calculations that are equal, such as:
  - 10 + 4 = _____
  - 9 + 5 = _____
  - 8 + 6 = _____
  - 15 − 1 = _____

    or
  - 92 + 17 = _____
  - 90 + 19 = _____
  - 89 + 20 = _____
  - 100 + 9 = _____
- Discuss and compare possible estimation strategies.
- Use age-appropriate vocabulary and real-life examples.

Key Vocabulary:

- Number pairs
- Remaining
- Regroup
- Borrow
- Carry
- Approximate
- Exact
- Around
- Accurate

Sentence Frames:

- The sum of _____ and _____ is _____.
- _____ plus _____ equals _____.
- When I subtract _____ from _____, I get _____.
- The difference between _____ and _____ is _____.
- The estimate for adding _____ and _____ is _____ because _____.
- To prove my answer is correct, I can _____.
- Subtracting _____ from _____ can be thought of as _____ plus a number is _____.

Learning Supports:

- Coloured counters
- Ten frames
- Number lines
- Pan balance
- Decks of cards
- Various games such as *Mancala*, *NIM*, backgammon, *Snakes and Ladders*, etc.
- Mental Math Strategies (BLM 5-8.8) (https://www.edu.gov.mb.ca/k12/cur/math/mm_gr8/index.html)

Mental Math:

- Single- and double-digit subtraction.
- Add and subtract zero.
- Double values (8 + 8).
- Subtract the same value (5 − 5).
- Given 12 + 16 = 28, determine the related subtraction.

Problem Solving:

- Juan sold 13 tomatoes in the market on Thursday. He sold 15 on Friday.
  - On what day did he sell more tomatoes?
  - How many more did he sell on Friday?
  - How many tomatoes did he sell altogether in the two days?
- Amar started with $100 in the morning. He bought a cap for $30. How much money does he have left?
- Metro is saving for a new laptop. So far, he saved $175. A new laptop costs $500. How much more money does Metro need to save?

LAL Numeracy Phase 1A: **Number: Multiplication and Division with Whole Numbers**

Big Ideas: The four operations are intrinsically related. Flexible methods of calculation require a strong understanding of operations and properties of the operation. There are a variety of ways to estimate sums, differences, products, and quotients.

	Numeracy	Language

Outcomes
3N11, 3N12
	Develop number sense:
	■ Describe meanings of multiplication as "repeated addition," "equal groups," and "an array."
	■ Describe meanings of division as "equal sharing (partitive)," "equal grouping," and "repeated subtraction."
	■ Demonstrate an understanding of multiplication (2- or 3-digit numerals by 1-digit numerals) to solve problems by
	  ■ using personal strategies for multiplication with and without concrete materials
	  ■ using arrays to represent multiplication
	  ■ connecting concrete representations to symbolic representations
	  ■ estimating products
	■ Demonstrate an understanding of division (1-digit divisor and up to 2-digit dividend) to solve problems by
	  ■ using personal strategies for dividing with and without concrete materials
	  ■ deriving remainders in division problems
	  ■ estimating quotients
	  ■ relating division to multiplication
	■ Explain properties of 0 and 1 in multiplication and the property of 1 in division.
	■ Explain why a number cannot be divided by 0.
		■ Listen to and understand simple words, phrases, or sentences with or without visual aids such as physical movement, gestures, realia, and pictures.
		■ Express simple ideas using keywords, short phrases, and short sentences in structured, familiar situations, with or without visual aids.
		■ Use visuals, realia, and their first language to begin to add basic knowledge, concepts, and skills related to the core subject areas.
		■ Respond appropriately to basic personal questions and engage in short classroom or social interactions, using phrases or simple sentences; indicate understanding or lack of understanding with gestures or short phrases.
		■ Use basic cognitive strategies, with guidance and support, to enhance language learning (e.g., memorize new words, etc.).

Connection to Prior Learning	■ Represent, compare, and order whole numbers concretely, pictorially, and symbolically. ■ Demonstrate the ability to do repeated addition and skip-counting forwards, using number lines and counters. ■ Demonstrate the ability to do repeated subtraction and skip-counting backwards, using number lines and counters.	Use visuals and realia to add knowledge and skills about multiplication and division. ■ Explain—orally, pictorially, symbolically, and in writing—the strategy chosen for multiplication and division in a series of simple sentences. ■ Explain how to derive the solution to multiplying and dividing two numbers. ■ Write solutions to multiplication and division using symbols and an equals sign. ■ Demonstrate the result when a number is multiplied by zero or one, and when for division the divisor is 1. ■ Derive and explain an estimate of a multiplication and division computation.
	Instructional Strategies: ■ Represent and explain multiplication and division using equal groups and arrays. ■ Learn multiplication facts at the same time as related division facts. ■ Model multiplication and division using concrete and visual representations, and record the process symbolically. ■ Explore commutative property (knowing 3×8 is the same as 8×3). ■ Represent multiplication facts as repeated addition and skip-counting forwards. ■ Represent division facts as repeated subtraction and skip-counting backwards.	**Assessment Criteria:** Use mathematical keywords, short phrases, and short sentences to do the following: ■ Represent a multiplication expression as repeated addition. ■ Represent a repeated addition as multiplication. ■ Create and illustrate a story problem for a number sentence. ■ Represent, concretely or pictorially, equal groups for a number sentence. ■ Represent a multiplication expression using an array. ■ Create an array to model the commutative property of multiplication. ■ Relate multiplication to division by using arrays and by writing related number sentences.

LAL Numeracy Phase 1B: **Number: Multiplication and Division with Whole Numbers** *(continued)*

Instructional Strategies: *(continued)*

- Use known facts and doubling and halving to determine the answer:
  - 7×4, think double of (7×2)—both are 28
  - $48 \div 6$, think double of $(24 \div 6)$—both are 8
- Play multiplication and division games using cards, dice, arrays, etc.

Assessment Criteria: *(continued)*

- Identify events from an experience that can be described as equal sharing.
- Identify events from an experience that can be described as equal grouping.
- Illustrate, with counters or a diagram, a story problem involving equal sharing, presented orally or through shared reading, and solve the problem.
- Illustrate, with counters or a diagram, a story problem involving equal grouping, presented orally or through shared reading, and solve the problem.
- Listen to a story problem, represent the numbers using manipulatives or a sketch, and record the problem with a number sentence.
- Create and illustrate, with counters, a story problem for a number sentence.
- Represent a division expression as repeated subtraction.
- Represent a repeated subtraction as a division expression.
- Relate division to multiplication by using arrays and by writing.
- Solve problems involving multiplication and division.
- Explain the meaning of a remainder when the remainder is greater than 0.

Learning Experiences

Language Foundation:

- Describe multiplication using addition.
- Describe multiplication using division.
- Discuss the meaning of place value in calculations.

Key Vocabulary:

- Multiply
- Product
- Times
- Carry
- Divided by
- Into
- Per
- Quotient
- Remainder
- Groups
- Shaping
- Array

Sentence Frames:

- _____ multiplied by 5 is _____.
- _____ times _____ equals _____.
- Multiplying _____ and _____ is approximately _____.
- _____ divided by _____ equals _____.
- The quotient of _____ divided by _____ is _____.
- The product of _____ and _____ is about _____.

Learning Supports:

- Coloured counters
- Number line
- Ten frames
- Base-10 blocks
- Multiplication chart
- Grid paper
- Games such as *Race to 100*, *Shikaku*, and *Ken-Ken*
- Anchor chart of words that represent multiplication and division

Mental Math:

- Use basic multiplication and division strategies.
- Use multiplication and division facts (single digit).
- Multiply by 1 and 0.
- Divide single digits into single digits and single digits into double digits (less than 20).
- Divide by 1.

Problem Solving:

- In the market, Nina's father earns $290 per week. Estimate how much he will earn in four weeks.
- Dogs have two ears and four feet. If you have eight dogs in your yard, how many ears and feet will you see?
- Six people share 18 bananas.
  - How many bananas will each person get?
- Max baked three cherry pies.
  - If he cut each pie into eight slices, how many slices will Max get altogether?
  - If six of his friends share all the slices of the pie, how many slices did each friend get?

LAL Numeracy Phase 1A: **Number: Representation of Fractions**

Big Ideas: Quantities can be represented concretely, pictorially, and symbolically. There are different but equivalent representations of numbers; our number system is based on patterns; classifying numbers provides information about their characteristics.

	Numeracy	Language

Outcomes 3N13	Develop number sense:
	■ Describe meanings of fractions as “a set or group,” “region,” “measure,” and “division.”
	■ Demonstrate an understanding of fractions by
	  ■ explaining that a fraction represents a portion of a whole divided into equal parts
	  ■ describing situations in which fractions are used
	  ■ comparing fractions of the same whole with like denominators
	■ Compare fractions to a benchmark of 1 whole. Are they less then, equal to, or greater than 1?
	■ Represent and explain how 1 whole can be represented as a fraction concretely, pictorially, and symbolically
	■ Compare fractions with the same numerator.
	■ Identify unit fractions on a number line between zero and one.
	■ Order unit fractions on a number line and symbolically.
	■ Relate improper fractions to mixed numbers.
		■ Listen to and understand simple words, phrases, or simple sentences, with or without visual aids such as physical movement, gestures, realia, and pictures.
		■ Express simple ideas using keywords, short phrases, and short sentences in structured, familiar situations, with or without visual aids.
		■ Use visuals, realia, and their first language to begin to add basic knowledge, concepts, and skills related to the core subject areas.
		■ Respond appropriately to basic personal questions and engage in short classroom or social interactions, using phrases or simple sentences; indicate understanding or lack of understanding with gestures or short phrases.
		■ Use basic cognitive strategies, with guidance and support, to enhance language learning (e.g., memorize new words, etc.).

Connection to Prior Learning	■ Compose and decompose whole numbers using part-part-whole relationships. ■ Represent, describe, and compare whole numbers to 1000. ■ Represent whole numbers on a number line.	Using oral language and visuals to develop knowledge about fractions, students are able to do the following: ■ Demonstrate how fractions represent parts of a whole by writing appropriate fractions using diagrams and symbols. ■ Demonstrate their comprehension of fractions by drawing out the parts of the whole from a problem and writing it in a fractional format. ■ Draw and represent unit fractions on a number line and explain, using key vocabulary, how to represent these fractions. ■ Demonstrate how shapes can be divided into equal parts and how various parts of a whole can be represented in a fractional format.
	Instructional Strategies: ■ Concretely and pictorially represent fractions as sets of objects and shaded areas, and numbers on a number line. ■ Concretely and pictorially compare and order fractions with like denominators. Note: Understand that for different wholes, identical fractions will not represent the same quantity. For example, half of a package of 10 cookies is not the same as half of a bag of 30 cookies. ■ Concretely and pictorially compare and order fractions with like numerators. ■ Symbolically represent and order fractions using benchmarks. ■ Extend an understanding of fractions for values greater than 1 whole. ■ Symbolically convert improper fractions to mixed numbers.	**Assessment Criteria:** Using keywords, short phrases, and short sentences, students are able to demonstrate the following: ■ Identify common characteristics of a set of fractions. ■ Describe everyday situations where fractions are used. ■ Cut or fold a whole into equal parts, or draw a whole in equal parts; demonstrate that the parts are equal and name the parts. ■ Sort a set of diagrams of regions into those that represent equal parts and those that do not, and explain the sorting. ■ Represent a fraction concretely or pictorially. ■ Name and record the fraction represented by the shaded and non-shaded parts of a region. ■ Compare fractions with the same denominator.

LAL Numeracy Phase 1B: **Number: Representation of Fractions** *(continued)*

Assessment Criteria: ***(continued)***

- Identify the numerator and denominator for a fraction.
- Model and explain the meaning of numerator and denominator.
- Convert improper fractions into mixed numbers.
- Indicate fractions on a number line that is between 0 and 1, and explain why a fraction is larger than or smaller than another fraction.

Learning Experiences

Language Foundation:

- Discuss the meaning of how a fraction represents a portion of a whole divided into equal parts.
- Compare fractions of the same whole with like denominators.
- Explain why fractions with numerators greater than the denominators are greater than one.
- Discuss what the numerator represents in a fraction.
- Discuss what the denominator represents in a fraction.
- Describe the process of comparing fractions

Key Vocabulary:

- Fraction
- Unit fraction (numerator is one)
- Whole (numerator and denominator are the same number)
- Numerator
- Denominator
- Greater than
- Less than
- Equal to
- Divide
- Equivalent

Sentence Frames:

- The fraction $\left(\frac{1}{2}, \frac{1}{3}, \frac{1}{4}\right)$ represents _____ parts out of _____.
- The fraction _____ is greater than/equal to/less than) one because _____.

Learning Supports:

- Coloured counters
- Tens frames
- Cuisenaire rods
- Fraction strips
- Pattern blocks
- Grid paper
- Decks of cards

Mental Math:

- Estimate placement of fractions on a number line.
- Identify numerator and denominator as shaded part of a shape.
- Compare fractions with same denominators.
- Have students identify parts of a set.
- Represent a whole number as a fraction.

Problem Solving:

- Fernandez ate $\frac{3}{4}$ of a chocolate bar and Katy ate $\frac{1}{2}$. Who ate more? Explain how you got your answer.
- Abdi cut a pizza in 10 slices. His friend ate $\frac{1}{2}$ of the slices. How many slices did the friend eat?
- Nancy had 10 friends visiting her. She bought four strawberry and six chocolate ice cream cones. What fraction of the ice cream is strawberry flavoured?
- For a community get-together of 50 families, 20 families brought dessert. What fraction of the community brought dessert?

LAL Numeracy Phase 1A: **Patterns and Relations: Patterning and Algebraic Thinking**

Big Ideas: Patterns can be represented in a variety of ways. Relationships can be described and generalizations made for mathematical situations that have numbers or objects that repeat in predictable ways.

	Numeracy	Language
Outcomes **1PR1, 1PR2, 2PR1, 2PR2, 3PR1, 3PR2, 4PR1, 4PR2**	Identify and use patterns: ■ Describe, extend, compare, and create repeating, increasing, and decreasing patterns. ■ Identify and describe patterns found in tables and charts, including a multiplication chart.	■ Use visuals and realia to add new knowledge, concepts, and skills for communication and participation in the classroom. ■ Express ideas using keywords, short phrases, and short sentences in structured, familiar situations, with or without visual aids such as physical movement, gestures, realia, pictures, or acting out. ■ Observe and experience problem-solving situations in the classroom. ■ Listen and attempt to understand opinions expressed in familiar social and classroom settings. ■ Share ideas, thoughts, opinions, and preferences using short sentences.
Connection to Prior Learning	■ Skip-counting forwards and backwards. ■ Describe order or relative position using ordinal numbers. ■ Demonstrate an understanding of addition and subtraction.	Identify important information and ideas using keywords and short sentences to do the following: ■ Create and describe a variety of numeric and geometric patterns. ■ Record the pattern in a table of values chart that shows the term and the term number. ■ Create a number pattern involving addition, subtraction, multiplication, and division. ■ Describe the pattern rule and make predictions related to repeating geometric patterns.
	Instructional Strategies: ■ Explore patterns containing two, three, or four elements in their core. ■ Use manipulatives, counters, and coins to model regular patterns and predict elements of a pattern. ■ Use number line and graphic organizers to model regular patterns and predict elements of a pattern. ■ Translate repeating patterns from one representation to another, such as between concrete, number line, and tables. ■ Identify patterns found in tables and charts (e.g., hundred chart, addition table, calendar, and then multiplication chart). For example: ■ Use blank monthly calendar with one date given on a random day. Use patterns to solve problems such as: "What is the day of the week for the first of the month?" ... the last day of the month?" ■ Use toothpicks to make a pattern. Encourage students to create and determine the number of toothpicks for the next shape (see image).  ■ Solve problems by finding missing values within the hundred chart.	**Assessment Criteria:** Using keywords, short phrases, and short sentences, do the following: ■ Identify the core of a repeating pattern. ■ Identify and explain the rule for different patterns using objects or numbers. ■ Create a concrete, pictorial, or symbolic pattern and describe the rule found in a table or chart. ■ Identify and explain errors in an increasing or decreasing pattern. ■ Identify and describe various increasing or decreasing patterns found on a hundred chart and multiplication chart. ■ Determine the missing element in a pattern. ■ Translate the information provided in a problem into a table or chart. ■ Identify and extend the patterns in a table or chart to solve a problem.

LAL Numeracy Phase 1A: **Patterns and Relations: Patterning and Algebraic Thinking** *(continued)*

Learning Experiences

Language Foundation:

- Demonstrate, orally and in writing, an understanding of increasing and decreasing repeating patterns by
  - describing
  - reproducing
  - extending
  - creating
  - using manipulatives, diagrams, sound, and actions
- Identify, describe relationships, and derive expressions for patterns (e.g., elements go up by 2).

Key Vocabulary:

- Core
- Table
- Pattern
- Increasing
- Decreasing
- Element
- Missing
- Before
- After
- In between
- Predict
- Extend
- Create
- Term
- Rule
- Skip-counting

Sentence Frames:

- The next number/shape in this pattern is _____.
- The missing element of this pattern is _____ because _____.
- This pattern is (increasing/decreasing) because _____.
- In this pattern _____, the _____ term would be _____.

Learning Supports:

- Coloured counters
- Tens frames
- Decks of cards
- Number line
- Pattern blocks
- Hundred chart
- Addition table
- Multiplication table

Mental Math:

- Single-digit computations.
- Identify increasing and decreasing patterns.
- Identify missing elements in a pattern.
- Describe a simple pattern using expressions of addition and subtraction.

Problem Solving:

- Lin sells scarves in the market. Each day, she sells one more scarf than the previous day.
  - If she sold two scarves on the first day, how many scarves did she sell on the other days of that week? How much money did she make each day of this week?
  - Describe the pattern of Lin's sales.
  - If she sold 16 scarves on Tuesday, how many scarves did she sell on the previous Saturday?
  - If Lin sells her scarves for $5 each, create a pattern that describes her earnings.

LAL Numeracy Phase 1A: **Shape and Space (2-D Shapes and 3-D Objects): Identifying, Sorting, Comparing, Constructing**

Big Ideas: Two- and three-dimensional objects can be described, classified, and analyzed by their attributes.

	Numeracy	Language

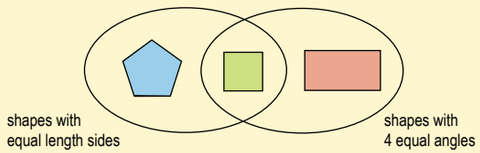
Outcomes
1SS2, 1SS3, 2SS6, 2SS7, 2SS9, 4SS5, 5SS6
	Develop spatial reasoning:
	■ Construct, describe, sort, and compare 2-D shapes, including regular and irregular polygons:
	  ■ triangles
	  ■ squares
	  ■ rectangles
	  ■ cubes
	  ■ spheres
	  ■ cones
	  ■ cylinders
	  ■ prisms
	  ■ pyramids
	  ■ circles
	■ Construct, describe, sort, and compare 3-D objects including:
	  ■ rectangular prisms including cubes
	  ■ triangular prisms.
	  ■ spheres
	  ■ cones
	  ■ cylinders
	  ■ pyramids
		■ Use visuals and realia to begin to add basic knowledge, concepts, and skills related to the core subject areas.
		■ Express ideas using keywords, short phrases, and short sentences in structured, familiar situations, with or without visual aids.
		■ Use simple cognitive strategies, with guidance, to enhance general learning (e.g., connect what they already know with what they are learning).

Connection to Prior Learning	■ Identify simple 2-D shapes such as a circle, square, and triangle and 3-D objects such as a box and a ball.	Recognize and connect concepts and skills by doing the following: ■ Describe—orally, by drawing, and in writing—characteristics of various shapes and objects, including how they are similar and different. ■ Identify 2-D shapes and 3-D objects in the classroom, the school, and the community. ■ Construct, describe, and sort 2-D shapes and 3-D objects.

LAL Numeracy Phase 1A: **Shape and Space (2-D Shapes and 3-D Objects): Identifying, Sorting, Comparing, Constructing** *(continued)*

Instructional Strategies:

- Describe and sort various shapes and objects.
- Compare and contrast attributes of various shapes.
- Draw 2-D shapes.
- Construct 3-D objects.
- Deconstruct 3-D objects into geometric nets or their 2-D components.
- Use graphic organizers such as Venn diagrams to show the relationship between shapes:



Assessment Criteria:

- Sort a set of quadrilaterals and explain the sorting rule.
  - Sort a set of quadrilaterals according to the lengths of the sides.
  - Sort a set of quadrilaterals according to whether or not opposite sides are parallel.
- Identify the characteristics of a set of triangles according to their sides or their interior angles.
  - Sort a set of triangles and explain the sorting rule.
- Identify and name common attributes of prisms.
- Identify and describe regular and irregular polygons in the environment.
- Construct rectangular prisms from their geometric nets.
- Construct triangular prisms from their geometric nets.
- Identify examples of rectangular and triangular prisms found in the environment.

Learning Experiences

Language Foundation:

- Describe characteristics of 2-D shapes:
  - Triangle: A three-sided closed figure
    - — Equilateral triangle: All sides and angles are equal.
    - — Isosceles triangle: Any two sides are equal and their opposite angles are equal.
    - — Scalene triangle: No side or angle is equal.
  - Quadrilaterals: A four-sided closed figure (If all sides and all angles are equal, it is called a regular quadrilateral.)
    - — Square: A figure of four equal sides and four equal right angles (This is a regular quadrilateral.)
    - — Rectangles: A figure with equal opposite sides and four equal right angles (This is an irregular quadrilateral.)
    - — Rhombus: A four-sided irregular quadrilateral
    - — Parallelogram: A four-sided irregular parallelogram (except for a square)
  - Pentagon: A five-sided closed figure (If all sides and all angles are equal, it is called a regular pentagon.)
  - Hexagon: A six-sided closed figure (If all sides and all angles are equal, it is called a regular hexagon.)
  - Circle: A radius determines the size of a circle; diameter is twice the radius.
- Compare and contrast 2-D shapes with 3-D objects.
- Describe the attributes of various 2-D shapes (number of sides, general size) and 3-D objects (size, shape).
- Discuss the process of constructing and deconstructing a 3-D object.
- Identify names of 2-D shapes found on the faces of 3-D objects.

Key Vocabulary:

- Side
- Edge
- Face
- Sort
- Construct
- Rectangles
- Squares
- Parallelogram
- Rhombus
- Pentagon
- Hexagon
- Triangles
- Equilateral
- Isosceles
- Scalene
- Cube
- Circles
- Radius
- Sphere
- Cone
- Prism
- Pyramid

Sentence Frames:

- This shape is called a _____ because _____.
- The _____ has _____ sides.
- The _____ has _____ faces.

LAL Numeracy Phase 1A: **Shape and Space (3-D Shapes and 2-D Objects): Identifying, Sorting, Comparing, Constructing** *(continued)*

Learning Supports:

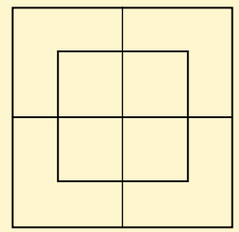
- Geometric nets for 3-D shapes
- Geoboards
- Graph paper
- Linking cubes
- Tangrams
- Pattern blocks

Mental Math:

- Identify number of sides, edges, and corners of various 2-D shapes and 3-D objects.
- Draw 2-D shapes and 3-D objects, given the object's name.

Problem Solving:

- Fern is sorting tiles that have different geometric shapes. Explain how she should sort them.
- Two squares have a side that measures 5 cm. What shape does it become when you put these two squares together? What is the length and the width of this new shape?
- Sam has three cubes. She connects them, touching side by side, on a table. She paints these cubes, but the sides facing the table or each other do not get painted. For each of the cubes, how many sides get painted?
- How many squares are there in this drawing?

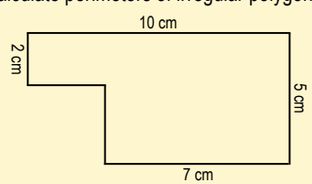


LAL Numeracy Phase 1A: **Shape and Space (Measurement): Length**

Big Ideas: Measurement involves a selected attribute of an object (length, area, mass, volume, capacity) and a comparison of the object being measured against non-standard and standard units. The longer the unit of measurement, the fewer units it takes to measure the object; the use of standard measurement unit simplifies communication about the size of the object.

	Numeracy	Language

Outcomes
1SS1, 2SS2, 2SS3, 2SS4, 3SS3
	Demonstrate an understanding of measuring length (cm, m) by
	■ selecting and justifying referents for the units cm and m
	■ modelling and describing the relationship between the units cm and m
	■ estimating length using referents
	■ measuring and recording length, width, and height
		Organize, structure, and sequence text and ideas to do the following:
		■ Differentiate between measuring different attributes such as length (height), mass (weight), and volume (capacity).
		■ Demonstrate that changing the orientation of an object does not alter the measurements of its attributes.
		■ Demonstrate an understanding of perimeter of regular and irregular shapes by
		  ■ estimating perimeter using referents for cm or m
		  ■ measuring and recording perimeter (cm, m)
		  ■ constructing different shapes for a given perimeter to demonstrate that many shapes are possible for a perimeter

Connection to Prior Learning	■ Demonstrate an understanding of place value. ■ Demonstrate an understanding of whole numbers using a number line. ■ Describe characteristics of 2-D shapes. ■ Demonstrate an understanding of addition.	Express and write keywords and simple sentences to do the following: ■ Identify and describe various 2-D shapes (rectangle, square, triangle, pentagon, hexagon, polygon). ■ Identify and name the length of objects with those measurements (cm and m). ■ Describe the measurement process. ■ Represent the lengths of an attribute of two objects and explain how much longer one object is over the other, using the same unit of measure. ■ Represent perimeter of regular shapes and irregular shapes, and explain the process used in the calculation.
	Instructional Strategies: ■ Compare and order objects by length, height, and distance around using non-standard units, and make statements of comparison. ■ Measure length (cm, m) of an object to the nearest unit. ■ Calculate the perimeter of a regular and an irregular shape. ■ Calculate perimeters of irregular polygons:  ■ Compare lengths of an attribute of two objects, and determine how much longer one object is than another, using standard and non-standard units of measure.	**Assessment Criteria:** Use keywords, short phrases, and short sentences to do the following: ■ Provide a personal referent for one centimetre and explain the choice. ■ Provide a personal referent for one metre and explain the choice. ■ Match a standard unit to a referent. ■ Estimate the length of an object using personal referents. ■ Determine and record the length or width of a 2-D shape. ■ Draw a line segment of a given length using a ruler. ■ Sketch a line segment of a given length without using a ruler. ■ Explain that changing the orientation of an object does not change the dimensions of the object. ■ Sort objects by a given attribute. ■ Determine which units are most effective for measuring the length of an object (cm or m).

LAL Numeracy Phase 1A: **Shape and Space (Measurement): Length** *(continued)*

Learning Experiences

Language Foundation:

- Explain the process of using a non-standard and standard unit of measurement.
- Describe the reasons for choosing a standard unit of measurement.
- Identify the steps required for using measurement tools.
- Discuss how to determine the perimeter of a given object.
- Describe how the perimeter of a rectangle changes when it is turned on its side.

Key Vocabulary:

- Length
- Width
- Perimeter
- Unit
- Regular shape
- Irregular shape
- Measure
- Centimetres (cm)
- Metres (m)
- Compare
- Longer
- Shorter
- Height
- Side
- Triangle
- Rectangle
- Square
- Pentagon
- Hexagon
- Polygon
- Ruler
- Base

Sentence Frames:

- The desk measures _____ hand-widths wide and _____ hand-widths long. The perimeter of the desk is _____ hand-widths.
- The perimeter of this classroom is best measured with _____(units) because _____.

Learning Supports:

- Rulers
- Geoboards
- Grid paper
- Pattern blocks
- Anchor chart of 3-D shapes

Mental Math:

- Determine perimeters of regular and irregular polygons.
- Addition of one- and two-digit whole numbers.
- Given a shape, estimate the perimeter.
- Given a shape and whole-number dimensions, calculate the perimeter.

Problem Solving:

- A giraffe is five metres tall and a tree is two metres shorter. How tall is the tree?
- A triangle has a base of 8 cm. Another triangle has a base of 11 cm. How much longer is the base of the second triangle?
- How much fencing would be needed if a rectangular field, measuring 18 metres by 21 metres, needs to be fenced on all four sides?
- Construct several rectangles with a perimeter of 32 cm.

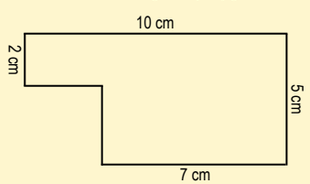
LAL Numeracy Phase 1A: **Shape and Space (Measurement): Area**

Big Ideas: Measurement involves a selected attribute of an object (length, area, mass, volume, capacity) and a comparison of the object being measured against non-standard and standard units. The longer the unit of measurement, the fewer units it takes to measure the object; the use of standard measurement unit simplifies communication about the size of the object.

	Numeracy	Language

Outcomes
2SS3, 2SS5, 4SS3
	■ Demonstrate an understanding of area of regular and irregular 2-D shapes made from rectangles and squares by
	  ■ recognizing that area is measured in square units
	  ■ selecting and justifying referents for the units cm^2 or m^2
	  ■ estimating area by using referents for cm^2 or m^2
	  ■ determining and recording area (cm^2 or m^2)
	  ■ recognizing that changing orientation of an object does not change the measurements of its attributes.
	  ■ constructing different rectangles for a given area (cm^2 or m^2) in order to demonstrate that many different rectangles may have the same area
		Use basic English discourse features to do the following:
		■ Demonstrate that changing the orientation of an object does not alter the measurements of its attributes.
		■ Demonstrate an understanding of area of regular and irregular shapes by
		  ■ estimating area using referents for cm^2 or m^2
		  ■ measuring lengths and calculating area (cm^2 or m^2)
		  ■ constructing different shapes for a given area to demonstrate that many shapes are possible for a perimeter

Connection to Prior Learning	■ Understand the intrinsic relationship of the four operations.
	■ Demonstrate an understanding of the meanings of multiplication as
	  ■ repeated addition
	  ■ equal groups or sets
	  ■ an array
		Using emergent vocabulary, orally and in writing, organize and sequence the steps needed to do the following:
		  ■ Demonstrate how to estimate and calculate area of a regular shape.
		  ■ Divide irregular shapes into regular figures to enable calculation of areas of each individual part.

	Instructional Strategies:
	■ Cut out regular and irregular polygons, overlay on grid paper, and count the number of squares the shape covers.
	  ■ Flip or turn this shape, count the number of squares the shape covers, and compare results.
	■ Using grid paper, draw all possible shapes of given areas.
	  ■ How many different rectangles can be drawn that cover 1 square? ... 2 squares? ... 3 squares? ... 4 squares? … 24 squares?
	■ Measure appropriate sides to gather information to calculate area.
	■ Calculate area of irregular polygons, such as the following, by decomposing this shape into smaller rectangles:
	 
	
		Assessment Criteria:
		■ Describe area as the measure of a surface recorded in square units.
		■ Provide a referent for a square centimetre and explain the choice.
		■ Provide a referent for a square metre and explain the choice.
		■ Determine which standard square unit is represented by a referent.
		■ Estimate the area of a 2-D shape using personal referents.
		■ Determine the area of a regular 2-D shape and explain the strategy.
		■ Determine the area of an irregular 2-D shape and explain the strategy.
		■ Construct a rectangle for a given area.
		■ Demonstrate that many rectangles are possible for an area by drawing at least two different rectangles for the same area.

Learning Experiences

Language Foundation:

- Discuss which standard square unit will be most appropriate for a specific area.
- Explain and represent the process of finding the area of a shape.
- Describe the following:
  - how an irregular shape can be broken up into smaller rectangles and squares
  - how an area of an irregular shape can be calculated

Key Vocabulary:

- Area
- cm^2 or m^2
- Length times width
- Decompose
- Square
- Squared

Sentence Frames:

- The length of this (rectangle/square) is _____ (units). The width is _____ (units). The area is _____ ($units^2$).
- Area is found by _____.

Learning Supports:

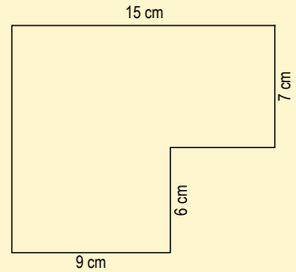
- Grid paper
- Geoboards
- Ruler
- Games (*Race to 100*, *Shikaku*)

Mental Math:

- Compare areas of objects with different dimensions.
- Determine area of regular and irregular shapes with single-digit dimensions.
- If the area of a rectangle is 20 cm^2 and its width is 4 cm, what is its length?

Problem Solving:

- What is the area of your desk? Explain your choice of units.
- How can we find the area of this classroom? What is the area of this classroom?
- Determine the area of the following irregular shape:



- Determine possible dimensions of several rectangles that have an area of 200 m^2.

LAL Numeracy Phase 1A: **Shape and Space: Volume**

Big Ideas: Two- and three-dimensional objects can be described, classified, and analyzed by their attributes. It is necessary to understand the attributes of the object before anything can be measured.

	Numeracy	Language
Outcomes **4SS4. 5SS3**	Demonstrate an understanding of volume by ■ explaining the relationship between area of the base and the height of a rectangular prism to the volume ■ selecting and justifying referents for the units cm^3 or m^3 ■ estimating volume by using referents for cm^3 or m^3 ■ measuring and recording volume (cm^3 or m^3) ■ constructing rectangular prisms for a given volume	■ Use visuals and realia to begin to add new knowledge, concepts, and skills for communication and participation in the classroom. ■ Express ideas using keywords, short phrases, and short sentences in structured, familiar situations, with or without visual aids such as physical movement, gestures, realia, pictures, or acting out. ■ Observe and experience problem-solving situations in the classroom (e.g., learning activities). ■ Listen and attempt to understand opinions expressed in familiar social and classroom settings. ■ Share ideas, thoughts, opinions, and preferences in short statements.

Connection to Prior Learning	■ Understand the intrinsic relationship of the four operations.
	■ Demonstrate an understanding of the meanings of multiplication as
	  ■ repeated addition
	  ■ equal groups or sets
	  ■ an array
	  ■ area
		Use keywords and short phrases to do the following:
		■ Describe, orally and in writing, the characteristics of volume.
		■ Determine the units to be used for different dimensions of volume.
		■ Explain how to measure the volumes of rectangular prisms.

	Instructional Strategies:
	■ Measure volume of boxes (rectangular prisms) with non-standard items such as marbles and cubes.
	  ■ Compare and discuss the appropriateness of the units used to measure volume. Recognize the need for a standard unit of measure.
	  ■ Transition from non-standard to standard units.
	■ Use different-sized boxes (rectangular prisms) and centicubes to
	  ■ estimate the volume
	  ■ measure the volume using centicubes to fill or model each box to the nearest whole unit
	  ■ examine the relationship between area of the base and the height of the box to the volume
	  ■ measure the dimensions of the box and calculate the volume
	■ Measure the attributes of a rectangular prism and calculate the volume. Turn this prism on its side and repeat the process. Compare the volumes calculated.
	■ Identify containers and objects in the classroom that would require a larger unit of measure. Discuss units that could be used to measure this volume (m^3).
	■ Make a cubic metre using cardboard.
	■ Estimate whether classroom objects have a volume greater than, less than, or about the same as a cubic metre.
	■ Have students identify items inside and outside of the classroom whose volume could be measured in cubic metres. Have students explain the reasons for their choices.
		Assessment Criteria:
		■ Identify the cube as the most efficient unit for measuring volume, and explain why.
		■ Provide a referent for a cubic centimetre, and explain the choice.
		■ Provide a referent for a cubic metre, and explain the choice.
		■ Determine which standard cubic unit is represented by a given referent.
		■ Estimate the volume of a 3-D object using personal referents.
		■ Determine the volume of a 3-D object using manipulatives, and explain the strategy.
		■ Construct a rectangular prism for a given volume.
		■ Explain that many rectangular prisms are possible for a given volume by constructing more than one rectangular prism for the same volume.

LAL Numeracy Phase 1A: **Shape and Space: Volume** *(continued)*

Learning Experiences

Language Foundation:

- Express understanding of volume as a measurement of the amount of space occupied by an object.
- Discuss the relationship between area and volume.
- Describe examples of volume measured in cubic centimetres (cm^3) or cubic metres (m^3).
- Explain what measurements are needed to calculate the volume of a rectangular prism.

Key Vocabulary:

- Length
- Width
- Area
- Height
- Base
- Volume

Sentence Frames:

- _____ has a volume of _____ because _____.
- The volume of the _____ is greater than, less than, or about the same as _____.
- The base of a railway car container has an area of _____ m and a height of _____ m. The volume of this container is _____ m^3.

Learning Supports:

- Centicubes
- Metre sticks
- Rulers
- Cardboard
- Base-10 blocks

Mental Math:

- Multiplication of three whole numbers.
- Calculate volume of objects with single-digit dimensions.
- Estimate volume of objects.
- Given objects of different sizes, determine the most efficient units for volume.

Problem Solving:

- Dmitri has a choice between one big box that measures 25 cm by 12 cm by 20 cm or three smaller boxes with volumes of 200 cm^3, 120 cm^3, and 100 cm^3. What would Dmitri choose? Why?
- How many more centicubes will fit in a cereal box compared to a tissue box?
- A rectangular prism has a volume of 200 cm^3. What are possible dimensions of the prism?

LAL Numeracy Phase 1A: **Shape and Space (Measurement): Mass**

Big Ideas: Measurement involves a selected attribute of an object (length, area, mass, volume, capacity) and a comparison of the object being measured against non-standard and standard units. The use of standard measurement unit simplifies communication about the size of the object.

	Numeracy	Language

Outcomes
2SS2, 2SS3, 3SS4
	■ Demonstrate an understanding of mass in grams (g) and kilograms (kg) by
	  ■ selecting and justifying referents for the use of units *g* and *kg*
	  ■ modelling and describing the relationship between the units *g* and *kg*
	  ■ estimating mass using referents
	■ Describe the relationship between grams and kilograms.
	■ Demonstrate that changing the orientation of an object does not change the mass of the object.
		Use an oral repertoire, phrases, short sentences, and L1 to do the following:
		■ Describe the difference between standard units of grams and kilograms.
		■ Describe the mass of an object.

Connection to Prior Learning	■ Demonstrate an understanding of place value. ■ Represent and order whole numbers.	Use essential information and short sentences to do the following: ■ Explain when to use grams and when to use kilograms. ■ Compare two objects and explain, orally and in writing, which one is heavier or lighter and by how much.
	Instructional Strategies: ■ Compare referents of 3-D objects that have a mass of approximately 1g, 100 g, and 1 kg. ■ Compare household purchases using grams and kilograms (e.g., comparing a bag of candy with a bag of potatoes).	**Assessment Criteria:** ■ Provide a personal referent for one gram and explain the choice. ■ Provide a personal referent for one kilogram and explain the choice. ■ Match a standard unit to a referent. ■ Explain the relationship between 1000 grams and 1 kilogram using a model. ■ Estimate the mass of an object using personal referents. ■ Provide examples of 3-D objects that have a mass of approximately 1g, 100g, and 1kg.

LAL Numeracy Phase 1A: **Shape and Space (Measurement): Mass** *(continued)*

Learning Experiences

Language Foundation:

- Describe the difference between grams and kilograms.
- Compare and contrast different household items with standard referents.
- Discuss choice of units when representing the mass of an object.

Key Vocabulary:

- Mass
- Weight
- Heavy
- Grams
- Kilograms
- Heavier
- Lighter

Sentence Frames:

- _____ is heavier than _____ because _____.
- _____ has an estimated mass of _____ (g/kg).
- The mass of _____ is best represented with the units _____ (grams/kilograms).

Learning Supports:

- Number line
- Mass scale
- Pan balance
- Metric weights
- Hundred chart
- Thousand chart

Mental Math:

- Compare mass of various objects using standard referents, and determine which is heavier or lighter and by how much.

Problem Solving:

- An apple has a mass of 250 grams. What will be the mass of four apples?
- The mass of a dictionary is 1540 grams. A basketball is 350 grams lighter. What is the mass of the basketball?
- Jon weighs 140 kg. He is four times heavier than his sister. What is the weight of his sister?
- What is heavier: 1 kg of feathers or 1 kg of marbles?

LAL Numeracy Phase 1A: **Shape and Space (Measurement): Time**

Big Ideas: The longer the unit of measurement, the fewer units it takes to measure the object; the use of a standard measurement unit simplifies communication about the size of the object.

	Numeracy	Language

Outcomes
2SS1, 3SS1, 3SS2, 4SS1, 4SS2
	■ Demonstrate an understanding of the relations between various units of time.
	■ Read and record
	  ■ time using digital and analog clocks, including 24-hour clocks
	  ■ calendar dates in a variety of formats
		■ Use visuals and realia to begin to add new knowledge, concepts, and skills for communication and participation in the classroom.
		■ Express ideas using keywords, short phrases, and short sentences in structured, familiar situations, with or without visual aids such as physical movement, gestures, realia, pictures, or acting out.
		■ Observe and experience problem-solving situations in the classroom (e.g., learning activities).
		■ Listen and attempt to understand opinions expressed in familiar social and classroom settings.
		■ Share ideas, thoughts, opinions, and preferences in short statements.

Connection to Prior Learning	■ Using concrete, pictorial, and symbolic representations, demonstrate an understanding of the following:
	  ■ ordering and comparing whole numbers
	  ■ skip-counting
	  ■ addition
	  ■ place value
	  ■ comparing fractions to benchmarks
		Know and use emergent repertoires of words and phrases to do the following:
		■ Demonstrate the relationship between seconds, minutes, hours, days, weeks, months, and years.
		■ Explain orally and represent the passage of time for an activity (such as how long it takes to get to school, etc.).
		■ Describe different formats in which calendar dates are written.

	Instructional Strategies: ■ Select and use a non-standard unit of measure, such as television shows or pendulum swings, to measure the passage of time. ■ Identify activities that can and cannot be accomplished in minutes, hours, days, months, and years. ■ Provide personal referents for seconds, minutes, and hours. ■ Read and record time using digital and analog clocks, including stopwatches and 24-hour clocks. ■ Compare 12-hour clocks and 24-hour clocks using double number lines. ■ Determine the number of days in any month, using a calendar. ■ Solve problems using the number of minutes in an hour or number of days in a given month. ■ Create a personal day planner with benchmark time displayed on a vertical or a horizontal number line. ■ Write dates in a variety of formats such as yyyy/mm/dd, dd/mm/yyyy, March 21, 2019, dd/mm/yy. ■ Read and record calendar dates in a variety of formats. ■ Relate dates written in a variety of formats (e.g., yyyy/mm/dd, dd/mm/yyyy, March 21, 2006, dd/mm/yy) to dates on a calendar. ■ Explore the functions of the time and calendar apps on a mobile phone or a tablet.	**Assessment Criteria:** Use keywords, short phrases, and short sentences to do the following: ■ State the number of hours in a day. ■ Represent the relationship between seconds, minutes, hours, days, weeks, months, and years. ■ Express the time orally and numerically from 12-hour analog and digital clocks. ■ Express the time orally and numerically from 24-hour analog and digital clocks. ■ Describe time orally as “minutes to” or “minutes after” the hour. ■ Explain the meaning of a.m. and p.m., and provide an example. ■ Explain and represent the passage of time to do an activity (e.g., walking to the store may be minutes but going on vacation may be days). ■ Write dates in a variety of formats (e.g., yyyy/mm/dd, dd/mm/yyyy, March 21, 2006, dd/mm/yy). ■ Identify possible interpretations of a given date (e.g., 06/03/04).

LAL Numeracy Phase 1A: **Shape and Space (Measurement): Time** *(continued)*

Learning Experiences

Language Foundation:

- Compare and explain the relationship of the number of seconds to a minute, the number of minutes to an hour, the number of hours to a day, the number of days to a week, and the number of months to a year.
- Describe the passage of time to common activities using non-standard and standard units (e.g., seconds, minutes, hours, days, weeks, months, years).
- Discuss the relationship between the day of the week and the monthly calendar.

Key Vocabulary:

- Time
- Dates
- Calendar
- Seconds
- Minutes
- Hours
- Days
- Week
- Months
- Year
- a.m./p.m.
- O'clock
- Digital
- Analog

Sentence Frames:

- Right now, the time is _____ (a.m./p.m.).
- There are _____ in a(n) _____.
- It will take _____ (units) to _____.

Learning Supports:

- Various games that involve keeping track of time
- Number line
- Hour glass
- Stopwatch
- Analog clocks
- Digital clocks
- Calendars of various formats

Mental Math:

- Skip-counting by 5 up to 60.
- Tell time on an analog clock.
- Translate time from a digital clock to an analog clock.
- Read a calendar.
- Use blank monthly calendar with one date given on a random day. Use patterns to solve problems such as "What is the day of the week for the first of the month? ... the last day of the month?"
- Determine how long an activity will take.

Problem Solving:

- Yesterday, Eva played soccer at 11:30 a.m. She played for an hour and twenty minutes. What time did she finish?
- Today, Eva played soccer at 11:10 a.m. She came back home at 1:30 p.m. How long did she play soccer?
- My dog slept for 2,880 minutes. How many hours did he sleep?
- Carlos is reading a 120-page storybook. It takes him 240 minutes to read the entire book. If Carlos starts to read the book at 9:15 a.m., at what time will he finish reading his book if it is so good that he doesn't take any breaks?
- How many days old are you?

LAL Numeracy Phase 1A: **Shape and Space: Lines**

Big Ideas: Two- and three-dimensional objects can be described, classified, and analyzed by their attributes.

	Numeracy	Language

Outcomes
5SS5, 7SS3
	■ Construct, describe, and provide examples of lines that are
	  ■ parallel
	  ■ intersecting
	  ■ perpendicular
	  ■ vertical
	  ■ horizontal
		■ Use visuals and realia to begin to add new knowledge, concepts, and skills for communication and participation in the classroom.
		■ Express ideas using keywords, short phrases, and short sentences in structured, familiar situations, with or without visual aids such as physical movement, gestures, realia, pictures, or acting out.
		■ Observe and experience problem-solving situations in the classroom (e.g., learning activities).
		■ Listen and attempt to understand opinions expressed in familiar social and classroom settings.
		■ Share ideas, thoughts, opinions, and preferences in short statements.

Connection to Prior Learning	■ Identify various 2-D shapes and 3-D objects.
	■ Draw 2-D shapes.
	■ Construct 3-D objects.
	■ Deconstruct 3-D objects into geometric nets or their 2-D components.
		■ Using keywords and short phrases, describe
		  ■ lines and line segments
		  ■ parallel lines
		  ■ perpendicular lines
		  ■ intersecting lines

	Instructional Strategies: ■ Model and construct line segments using TPR (total physical response) strategies and manipulatives. ■ Identify examples of parallel, intersecting, and perpendicular lines inside and outside of the classroom. ■ Discuss types of lines found in artwork. ■ Sort, categorize, and label each set of lines. ■ Make comparisons and discuss features and characteristics that make each set of line segments—intersecting lines have one common point, perpendicular lines form a “square corner” at the point of intersection, parallel lines have no common intersecting point.	**Assessment Criteria:** Using keywords, short phrases, and short sentences, do the following: ■ Construct pairs of line segments that are parallel, perpendicular, and intersecting. ■ Identify line segments that are not parallel, perpendicular, or intersecting. ■ Identify real-world examples of parallel, perpendicular, and intersecting line segments. ■ Identify parallel, intersecting, perpendicular, vertical, and horizontal edges and faces on 2-D shapes and 3-D objects. ■ Draw 2-D shapes or 3-D objects that have edges, faces, and sides that are parallel, intersecting, perpendicular, vertical, or horizontal.

LAL Numeracy Phase 1A: **Shape and Space: Lines** *(continued)*

Learning Experiences

Language Foundation:

- Describe lines through kinesthetic movement, gestures, realia visuals, and graphic organizers.
- Describe the faces and edges of a 3-D object using terms such as parallel, intersecting, perpendicular, vertical, or horizontal.
- Compare and contrast intersecting and perpendicular lines.

Key Vocabulary:

- Line
- Plane
- Parallel
- Distance
- Perpendicular
- Intersect
- Square corners
- Right angles
- Point
- Vertical
- Horizontal

Sentence Frames:

- _____ lines are two lines that _____.
- Horizontal lines are drawn _____.
- Vertical lines are drawn _____.

Learning Supports:

- TPR (total physical response)
- Manipulatives (string, straws, stir sticks, toothpicks)
- Geoboards
- Grid paper
- Ruler
- Geometric nets

Mental Math:

- Draw/identify parallel, perpendicular, and intersecting lines.
- Name letters of the alphabet that contain horizontal, perpendicular, and/or parallel lines.
- Find intersecting, perpendicular, and/or parallel lines in any artwork and in the environment.

Problem Solving:

Provide a street map.

- Find streets that run parallel, run perpendicular, and intersect.
- Give directions from one location to another using vocabulary such as intersecting, perpendicular, and parallel.

LAL Numeracy Phase 1A: **Statistics and Probability: Methods of Data Collection, Organization, and Analysis**

Big Ideas: Data is gathered and organized in order to answer questions. Visual displays quickly reveal information about the data.

	Numeracy	Language
Outcomes **2SP1, 2SP2, 3SP1, 3SP2, 4SP2, 5SP1, 5SP2, 6SP1**	■ Collect, organize, display, and analyze data to solve problems. ■ Represent, organize, construct, label, and interpret bar graphs and line graphs to draw conclusions. ■ Differentiate between first- and second-hand data.	■ Listen to and understand simple words, phrases, or simple sentences, with or without visual aids such as physical movement, gestures, realia, and pictures. ■ Express simple ideas using keywords, short phrases, and short sentences in structured, familiar situations, with or without visual aids. ■ Use visuals, realia, and their first language to begin to add basic knowledge, concepts, and skills related to the core subject areas. ■ Respond appropriately to basic personal questions and engage in short classroom or social interactions, using phrases or simple sentences; indicate understanding or lack of understanding with gestures or short phrases. ■ Use basic cognitive strategies, with guidance and support, to enhance language learning (e.g., memorize new words, etc.).
Connection to Prior Learning	■ Demonstrate an understanding of one-to-one correspondence. ■ Represent, order, and compare whole numbers using a number line.	Use cognitive and interpersonal strategies to do the following: ■ Choose appropriate method of collecting data (such as questionnaire, measurement, experiments, databases, etc.). ■ Gather data by measuring aspects or asking questions of different people. ■ Represent data in a table or a chart and as a line or a bar graph.
	Instructional Strategies: ■ Collect first-hand data using a survey or checklist. ■ Justify appropriate methods of collecting data (e.g., surveys, experiments, databases, etc.). ■ Organize and represent the data in various ways (e.g., tally marks, line plots, charts, and lists). ■ Represent data collected using both a bar graph and a line graph, and compare to determine which representation is the most effective. ■ Construct, label, and interpret line and bar graphs to solve problems.	**Assessment Criteria:** Use keywords, short phrases, and short sentences to do the following: ■ Explain the difference between first-hand and second-hand data. ■ Find examples of second-hand data in print and electronic media, such as newspapers, magazines, and the Internet. ■ Identify and label title, axes, and intervals of bar and line graphs. ■ Create a bar or a line graph from a table of values or set of data. ■ Interpret a bar or a line graph to draw conclusions.

Learning Experiences

Language Foundation:

- Discuss the difference between first-hand and second-hand data.
- Formulate a question that can best be answered using first-hand data and second-hand data, and explain why.
- Explain the process of drawing a bar graph and a line graph.
- Describe how a graph represents data collected.

Key Vocabulary:

- Data
- Sort
- Order
- Bar graph
- Tally marks
- Line graph
- Charts
- Lists
- Table

Sentence Frames:

- The intervals of data on the graph will be _____ because _____.
- _____-hand data is (more/less) reliable because _____.

Learning Supports:

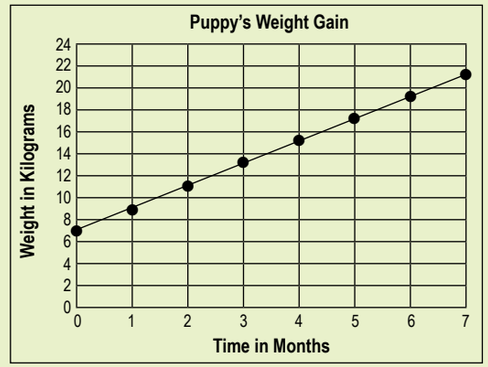
- Vertical and horizontal number lines
- Grid paper

Mental Math:

- Estimate placement of whole numbers on number lines with benchmarks.
- Skip-counting from a given number.
- Read data from line and bar graphs.
- Create a graph from a given data.

Problem Solving:

- A boy named Leo got a puppy for his birthday. He measured its weight over a few months and plotted the following graph from the data.



  - Why was an interval of 2 used to represent the weight of the puppy?
  - How long did it take the puppy to be 14 kg?
  - Describe the pattern indicated in this graph.

Problem Solving: ***(continued)***

- Heights of a few students in your class were measured:

Student	Height (cm)
Heidi	152
Cam	149
Jodene	135
Luigi	154
Kai	167

  - Will this data be best represented with a line graph or a bar graph?
  - Identify if the height will be represented on a horizontal or a vertical number line.
  - What interval for the height can be used when creating a graph?
- Create a project to gather first-hand data and analyze it.