Hesket PS
Numeracy
Learning and Teaching
Scope and Sequence

Planning Document

GRADE PREP

	Prep- Expected Standards for the End of the Year	NY	Sometimes	Always
N **u** **m** **b** **e** **r** **&** **A** **l** **g** **e** **b** **r** **a**	Can say, in sequence, the numbers from 1-100			
	Has fluency is counting forwards and backwards between 1 and 20			
	Understands numbers to 10, including matching number names, numerals and quantities			
	Completes simple addition problems with concrete materials1-10 eg.			
	Completes simple addition problems using calculators 1-10 using repetitive additions (eg. 1+1+1+1=4			
	Can make connections between verbally saying the number and writing the numeral 1-10			
	Immediate visual recognition of the numbers 1-20			
	Can recognise numbers before and after a said number 1-20			
	Understands that numbers are said in a particular order and that there are patterns in the way we say them which help us to remember the order (eg. hear the teen part of the sequence in 14 to 19)			
	Understands that each object must be counted once and once only in a collection			
	Understands that the arrangement of objects does not affect how many there are			
	Understands that, when counting a collection of objects, the last number counted answers 'how many'			
	Can compute doubles to 10 eg. double 4 is 8 or 4+4=8			
	Addition, subtraction, grouping and sharing to 10			
	Recognises that there are different coins and notes			
	Understands the concept, order and is able to write numerals 1-10			
	Can reorder numbers from 1-20			
	Understands ordinal numbers from 1st to 10th			
	Understands that numbers can be made of different groupings eg. 7 can be made by 2 and 5, 3 and 4, 2 and 2 and 1)			
	Automatic response to small collections up to 10 (eg. seeing 4 pebbles they can say 4 automatically without counting one by one)			
	Compare and order collections, initially to 20, and then beyond, and explain reasonings			
	Can compare collections to 10 using the words 'more', 'less', 'same as' and 'not the same'			
	Understands that simple story problems can be solved by modelling situations including adding to, taking some away, combining			
	Understands and models change situations			
	Can share between a group of people by giving each person and object one at a time			
	Can sort and classify familiar objects (eg. coloured pencils into colour groups) and explain reasoning			
	Can copy and create simple patterns with shapes, objects and drawings and name the next item in the pattern			

PREP EXPLICIT TEACHING STRATEGIES-
Number and Algebra

- **Daily 1.0hour numeracy block** including a whole-small-whole organisation with a ratio of 15 minute explicit introduction to the lesson as a **whole class (focusing and promoting/articulating the math vocab needed)**, breaking into an **independent activity** or rotational open-ended activities (with the teacher working explicitly with a **small group targeting the needs of students** and moving them forward in their learning, scaffolding the development of necessary skills) and then back to the whole group for 15 minutes to recap and **share experiences** and learning.

- **Modelled Mathematics**- The teacher introduces the learning experience, modelling and describing effective strategies, manipulating materials and recording the mathematics, making explicit the mathematics to be focussed on in the session. Use sentence starters like "watch me while I…", "Do you remember how we….?", "Listen while I explain…" (Use in first day of the week to introduce new math concepts or to link in new concepts with those skills already learnt.

- **Shared Mathematics**- The teacher and the students work together through the learning process. The teacher prompts the students, questioning and supporting them as they reinforce, modify and extend their skills and understandings. The students ask questions and suggest strategies. Use prompts eg. "Today we are looking at…", "What do you know about…?", "Tell me about…"

- **Guided Mathematics**- The teacher plays a guiding role in a small focus group (as with guided reading) as they think, talk and work their way through a mathematical experience

- **Independent Mathematics**- Carefully planned activities or activity that the students move on to one the whole class focus session has been completed. This could include small rotating group, focussing on the needs/abilities of different groups of students relating to the topic explored, or one whole open-ended task related to the topic which takes into account the different needs within the group.

- **Math Learning Experiences**- real life simulations that bring into practice the skills focused on for the week (eg. baking a cake for a focus on measurement, with children measuring out ingredients)

- **Link big book or shared text into math learning** (eg. who sank the boat)

- **Sequence activities** to build on skills and from previous tasks

- **Contextual Clues** – hands-on and visual support makes the language of math more comprehensible. For example, a lesson about patterns or positional language using manipulatives is more understandable, rather than explaining the concept.

- **Verbal Interaction** – providing students with opportunities to work together to solve problems.

- **Active Participation** – requiring active involvement in math activities motivates students, engages them in the learning process, and helps them remember content easier.

- Use correct **mathematical vocabulary** and concepts using [math games](), examples include Tic-Tac-Toe, bingo, and concentration.

- Integrate **ICT tools**, i.e., Mathletics, interactive math websites, and interactive computer games.

- Integrate **hands-on activities** by using manipulatives, real life materials, and calculators.

- **Respond to questions in a variety of ways**, i.e., think/pair/share, flashcards to raise over head, hand and/or body movements, individual chalkboards for solving computations.

- Integrate reading and writing about math through the use of class learning [journals](), grade **learning logs** and self assessment using symbols.

- Use **visuals** whenever possible to reinforce auditory instruction, i.e., charts, graphs, manipulatives, diagrams, models, real objects.

- Design **multi-sensory lessons** that address various student learning styles, i.e., visual, auditory, tactile, and kinesthetic.

- Use **math cloze** exercises or sentence prompts

- **Model the problem solving process** by talking aloud while solving problems on the overhead, chalkboard, or interactive white board to demonstrate thinking processes.

- Draw sketches, drawings, and models to see the problem.

- **Games** for tuning in

- Look for what is needed **solve the problem**, for example: how many will are left, the total will be, everyone gets red, everyone gets one of each, etc.

- **Effective teaching aids** for math include chalk boards, coins, Legos and colored markers, unifix, MAB, sticks, bundles, place value charts, fraction conversion charts

- Encourage a culture of **questioning and risk-taking** within learning.
- Develop **student learning goals** in mathematics which are reviewed by the students at the end of each term
- Creating opportunities for **daily verbal interaction** about the mathematics (**share time**)
- **Discussions**: Pair-Share, small group, whole class
- Modified teacher speech - Paraphrasing, repeat idea with correct vocabulary, adjust rate of speech, enunciate clearly (hundreds vs. hundredths)
- **Leveled Questions**-Adjusting questioning strategies to the language and mathematics levels of students
- **Real Strategies**- Connecting concept acquisition using real world objects (real life problem solving

- Use **anecdotal notes** made when working with small groups to create flexible groupings for different foci
- Use **observation, feedback and specific targeting** to move children forward with skill development
- Teach the counting of numbers (1-10 and 1-20) moving from rote counting to one-to-one correspondence
- Make links between counting numbers and ordinal numbers
- Engage students in identifying and creating different representations of numbers 1-20, including the recognition of 0
- Teach students to read and write numbers and to count, sort, order and label
- Explore pattern concepts, including dot patterns on dice

	Prep- Expected Standards for the End of the Year	NY	Sometimes	Always
S t a t i s t i c s & P r o b a b i l i t y	**Statistics and Probability**			
	Understands that data can be represented using objects or drawings (pictograms)			
	Can answer simple questions from pictographs eg. which is our favourite type of pet?			
	Participates in constructing class pictographs with data generated by the students likes/dislikes using drawings or images of the same size (eg. favourite colour using kinder squares with the child's name on their square, birth months- with cupcakes with each child's name on each, favourite toy with each child's name on each)			
	Can have simple discussions as a class about pictographs eg. there are 2 people that like the colour red, most people in our grade like barbie dolls, no-one in our class likes teddy bears, 1 person has their birthday in May			
	Can ask questions of others that can be answered with either 'yes' or 'no'			
	Can answer questions from others that can be answered with either 'yes' or 'no'			
	Recognises and responds to unpredictability and variability in events, such as getting or not getting a certain number on the roll of a die in a game or the outcome of a coin toss			
	Uses dice or similar devices to determine the outcome of, or to play, a game			
	Can solve simple problems by collecting data (eg. I wonder who likes chocolate? Then collecting responses with ticks or lines on a page)			
	Can play games in which there may be a different winner each time			
	Can discuss simple chance events (do you think it might rain today at lunchtime?)			
	Can gather simple objects from their own environment to use as data for simple pictographs (eg. collecting object			

PREP EXPLICIT TEACHING STRATEGIES-
Statistics and Probability

- Daily 1.0hour numeracy block including a whole-small-whole organisation with a ratio of 15 minute explicit introduction to the lesson as a whole class, breaking into an independent activity or rotational open-ended activities (with the teacher working explicitly with a small group targeting the needs of students and moving them forward in their learning, scaffolding the development of necessary skills) and then back to the whole group for 15 minutes to recap and share experiences and learning.
- Play dice games and coin-toss games to start the process of probability
- *Contextual Clues* – hands-on and visual support makes the language of math more comprehensible. For example, a lesson about fractions using manipulatives is more understandable, rather than explaining the concept.
- *Verbal Interaction* – providing students with opportunities to work together to solve problems. They need to give and receive information, along with completing authentic tasks working together using English.
- *Active Participation* – requiring active involvement in math activities motivates students, engages them in the learning process, and helps them remember content easier.
- Integrate educational technology tools, i.e., Mathletics, interactive math websites, and interactive computer games.
- Use chance games with dice, spinners, coins or bingo-type drawing
- Use graphic organizers to visually represent mathematical concepts.
- Respond to questions, i.e., think/pair/share, flashcards to raise over head, hand and/or body movements, individual chalkboards for solving computations.
- Integrate reading and writing about math through the use of learning journals, learning logs, and literature.
- Use visuals whenever possible to reinforce auditory instruction, i.e., charts, graphs, manipulatives, diagrams, models, real objects.

- Design multi-sensory lessons that address various student learning styles, i.e., visual, auditory, tactile, and kinesthetic.
- Model the problem solving process by talking aloud while solving problems on the overhead, chalkboard, or interactive white board to demonstrate thinking processes.
- Encourage students to use mathematics picture dictionary of terms and concepts or online maths dictionaries at www.coolmath.com
- Hands on math tasks
- Effective teaching aids for math include chalk boards, coins, Legos and colored markers. Discover how to make math a more visual endeavor with help from a math teacher
- Manipulatives- Connecting concept acquisition using specially designed blocks, unifix, MAB, sticks, bundles, place value charts, fraction conversion charts
- Use mathematic language
- attend to students' preconceptions and begin instruction with what students think and know
- focus on what is to be taught, why it is taught and what mastery looks like
- encourage a culture of questioning and risk-taking within learning.
- Develop student learning goals in mathematics which are reviewed by the students at the end of each term
- Build mathematics vocabulary
- Creating opportunities for verbal interaction about the mathematics
- Discussions: Pair-Share, small group, whole class
- Modified teacher speech - Paraphrasing, repeat idea with correct vocabulary, adjust rate of speech, enunciate clearly (hundreds vs. hundredths)
- Leveled Questions-Adjusting questioning strategies to the language and mathematics levels of students
- Real Strategies- Connecting concept acquisition using real world objects

	Prep- Expected Standards for the End of the Year	NY	Sometimes	Always
M **e** **a** **s** **u** **r** **m** **e** **n** **t** **&** **G** **e** **o** **m** **e** **t** **r** **y**	Understands basic concepts of measurement			
	Uses simple measurement language eg. longer, shorter, wider, thinner			
	Can directly compare objects using informal units (eg. uses streamers to measure whether objects are taller or shorter than each other, can pour water from one container to another to see if they both hold the same amount, measures the length of larger areas using footprints or handprints)			
	Uses simple directional language up, down, over, under, around			
	Understands that clocks tell time			
	Understands the difference between daytime/night time, yesterday/today/tomorrow			
	Makes connections between times and familiar events (eg. start of school, end of school, lunch)			
	Understands that time can be described in different ways such as on analogue or digital clocks			
	Understands that longer lengths of time are described in days weeks, months, seasons			
	Understands (on digital clocks) that the number before the : tells us the hour			
	Can recall and say the days of the week in sequence			
	Can link the days of the week with different activities (Monday- Friday are school days and Saturday and Sunday are the weekend, on Tuesdays we have sport)			
	Can sequence (in order) simple events that have happened during the day (eg. describing simple things that have happened at school- reading, writing, play, maths)			
	Can describe the position and movement of objects, including themselves eg. next to, between, near, behind, in front			
	Follows and gives simple directions for moving around familiar environments (eg. directing a friend around the classroom)			
	Can sort, describe and represent familiar 2D shapes in their environment (circle, square, triangle, rectangle)			
	Can name familiar 2D shapes			
	Can describe simple features of shapes (eg. this block has straight edges)			
	Can select a shape or object to march a given characteristic (can find things with straight edges, look like a triangle, are like boxes			
	Can describe which object they think is heavier, lighter, bigger, smaller			
	Can compare objects directly, by placing one next to another, to determine which one is longer, shorter, holds more			
	Uses measurement language eg. tall/taller, short/shorter, heavy/heavier, holds more/ holds less			
	Can describe if a cup/container is full/ half full/ empty			

PREP EXPLICIT TEACHING STRATEGIES-
Measurement and Geometry

- Daily 1.0hour numeracy block including a whole-small-whole organisation with a ratio of 15 minute explicit introduction to the lesson as a whole class, breaking into an independent activity or rotational open-ended activities (with the teacher working explicitly with a small group targeting the needs of students and moving them forward in their learning, scaffolding the development of necessary skills) and then back to the whole group for 15 minutes to recap and share experiences and learning.
- *Contextual Clues* – hands-on and visual support makes the language of math more comprehensible. For example, a lesson about fractions using manipulatives is more understandable, rather than explaining the concept.
- *Verbal Interaction* – providing students with opportunities to work together to solve problems. They need to give and receive information, along with completing authentic tasks working together using English.
- *Active Participation* – requiring active involvement in math activities motivates students, engages them in the learning process, and helps them remember content easier.
- Engage students in identifying and representing points, lines and curves in shapes- use comparing and sorting activities
- Teach students to describe features, locations and orientation of shapes and objects
- Teach vocab and conventions when measuring, including informal measurement language, cycle of the days of the week and months of the year and seasons
- Review mathematical vocabulary and concepts using math games, examples include Tic-Tac-Toe, bingo, and concentration.
- Integrate educational technology tools, i.e., Mathletics, interactive math websites, and interactive computer games.
- Integrate hands-on activities by using manipulatives, real life materials, and calculators.
- Respond to questions, i.e., think/pair/share, flashcards to raise over head, hand and/or body movements, individual chalkboards for solving computations.
- Integrate reading and writing about math through the use of learning journals, learning logs, and literature.
- Use graphic organizers to visually represent mathematical concepts.
- Use visuals whenever possible to reinforce auditory instruction, i.e., charts, graphs, manipulatives, diagrams, models, real objects.
- Design multi-sensory lessons that address various student learning styles, i.e., visual, auditory, tactile, and kinesthetic.
- Model the problem solving process by talking aloud while solving problems on the overhead, chalkboard, or interactive white board to demonstrate thinking processes.
- Encourage students to use mathematics picture dictionary of terms and concepts or online maths dictionaries at www.coolmath.com
- Hands on math tasks
- Effective teaching aids for math include chalk boards, coins, Legos and colored markers. Discover how to make math a more visual endeavor with help from a math teacher
- Manipulatives- Connecting concept acquisition using specially designed blocks, unifix, MAB, sticks, bundles, place value charts, fraction conversion charts
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- attend to students' preconceptions and begin instruction with what students think and know
- focus on what is to be taught, why it is taught and what mastery looks like
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- Develop student learning goals in mathematics which are reviewed by the students at the end of each term
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- Discussions: Pair-Share, small group, whole class
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GRADE ONE

	GRADE 1- Expected Standards for the End of the Year	NY	Sometimes	Always
Number & Algebra	Can order money amounts in cents			
	Can count forwards and backwards by 1 from different starting points between 1 and 100			
	Can count by 2s, 5s and 10s from 0 to a given target eg. 2, 4, 6, 8, 10 or 3,5,7,9			
	Can recognise a pattern when counting by 2s, 5s, 10s from different starting points from 0			
	Can add and subtract two digit multiples of ten by counting on and counting back			
	Can count on from the larger of two collections to find their total			
	Can calculate the next number when asked to add 1 or 2 to any whole number from 0-10			
	Can draw diagrams to show subtraction activities			
	Can order a list of small sets of numbers up to 99			
	Can draw a diagram to show sharing to up to 99 items			
	Can count by 1s, 2s, 5s, 10s and 20s to 100 and beyond			
	Can mentally compute addition and subtraction problems automatically to 50			
	Can complete addition, subtraction, grouping and sharing to 99 included worded problems			
	Can recognise all coins			
	Can say, understand and reason with number sequences to and from 100			
	Can use a calculator to increase understanding of counting patterns (eg. count by adding 2 each time, beginning with 0 and press =2 = = repeatedly)			
	Understands that skip counting (eg. counting 5c coins) will tell you how much money is in a collection			
	Can recognise, model, order and write the numerals for numbers to 100			
	Can understand place value of 2 digit numbers (eg. 42- the 4 means 4 tens and the 2 means 2 units)			
	Can recognise and read numerals on a chart and on a calculator			
	Can write numbers for a purpose (eg. recording the dates on a monthly calendar)			
	Can model numbers using available materials (eg. can show the number on a 100 frame, a calculator, with place value cards, with sticks of MAB, with linking cubes (unifix), using counters, bundles of icypole sticks) and can explain their reasoning			
	Can order numbers in sequence on a number line or on a 1-100 grid			
	Works will collections to 100 by grouping in 10s, counting in 10s			
	Uses place value to partition and regroup 2 digit numbers			
	Understands partitioning numbers eg. 7 is the same as 3 and 4, 6 and 1, 5 and 2			
	Understands one half as one of two equal parts (recognises half and whole). Can halve collections and split objects into two equal parts (eg. kinder square, shape)			
	Can copy, create, continue and describe patterns with objects and numbers to 100			
	Can count on from the biggest number when solving addition problems			
	Knows words for addition (add, plus, more) and subtraction (less, take away, difference)			
	Can see connections between addition and subtraction problems (eg. 7+4= 11 so 11-4=)			

GRADE 1 EXPLICIT TEACHING STRATEGIES-
Number and Algebra

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- **Modelled Mathematics**- The teacher introduces the learning experience, modelling and describing effective strategies, manipulating materials and recording the mathematics, making explicit the mathematics to be focussed on in the session. Use sentence starters like "watch me while I…", "Do you remember how we….?", "Listen while I explain…" (Use in first day of the week to introduce new math concepts or to link in new concepts with those skills already learnt.
- **Shared Mathematics**- The teacher and the students work together through the learning process. The teacher prompts the students, questioning and supporting them as they reinforce, modify and extend their skills and understandings. The students ask questions and suggest strategies. Use prompts eg. "Today we are looking at…", "What do you know about…?", "Tell me about…"
- **Guided Mathematics**- The teacher plays a guiding role in a small focus group (as with guided reading) as they think, talk and work their way through a mathematical experience
- **Independent Mathematics**- Carefully planned activities or activity that the students move on to one the whole class focus session has been completed. This could include small rotating group, focussing on the needs/abilities of different groups of students relating to the topic explored, or one whole open-ended task related to the topic which takes into account the different needs within the group.
- **Math Learning Experiences**- real life simulations that bring into practice the skills focused on for the week (eg. baking a cake for a focus on measurement, with children measuring out ingredients)
- **Link big book or shared text into math learning** (eg. who sank the boat)
- Model, represent and order numbers to 1000 including skip counting
- Teach students to recognise patterns through the use of 100s charts
- Encourage children to use a four function calculator
- Encourage students to describe simple fractions in relation to familiar objects
- Give opportunities for students to practice simple money calculations
- **Sequence activities** to build on skills and from previous tasks
- **Contextual Clues** – hands-on and visual support makes the language of math more comprehensible. For example, a lesson about fractions using manipulatives is more understandable, rather than explaining the concept.
- **Verbal Interaction** – providing students with opportunities to work together to solve problems. They need to give and receive information, along with completing authentic tasks working together using English.
- **Active Participation** – requiring active involvement in math activities motivates students, engages them in the learning process, and helps them remember content easier.
- Teach students to **identify key words** for solving word problems and identifying mathematical operations.
- Review **mathematical vocabulary** and concepts using math games, examples include Tic-Tac-Toe, bingo, and concentration.
- Integrate educational **technology tools**, i.e., Mathletics, interactive math websites, and interactive computer games.
- Integrate **hands-on activities** by using manipulatives, real life materials, and calculators.
- **Respond to questions**, i.e., think/pair/share, flashcards to raise over head, hand and/or body movements, individual chalkboards for solving computations.
- Integrate reading and writing about math through the use of learning journals, **learning logs**, and literature.
- Use **graphic organizers** to visually represent mathematical concepts.
- Use **visuals** whenever possible to reinforce auditory instruction, i.e., charts, graphs, manipulatives, diagrams, models, real objects.
- Design **multi-sensory lessons** that address various student learning styles, i.e., visual, auditory, tactile, and kinesthetic.
- Use **math cloze** exercises or sentence prompts

- **Model the problem solving process** by talking aloud while solving problems on the overhead, chalkboard, or interactive white board to demonstrate thinking processes.
- Encourage students to use **mathematics picture dictionary** of terms and concepts or online maths dictionaries at www.coolmath.com
- Draw sketches, drawings, and models to see the problem.
- **Make connections**-Is the word problem similar to a previous work, if so how was it solved?
- **Work the problem in reverse** or backwards, starting with the answer to see if you wind up with your original problem.
- **Games** for tuning in
- Look for what is needed **solve the problem**, for example: how many will are left, the total will be, everyone gets red, everyone gets one of each, etc.
- **Effective teaching aids** for math include chalk boards, coins, Legos and colored markers. Discover how to make math a more visual endeavor with help from a math teacher
- **Manipulatives**- Connecting concept acquisition using specially designed blocks, unifix, MAB, sticks, bundles, place value charts, fraction conversion charts

- Encourage a culture of **questioning and risk-taking** within learning.
- Develop **student learning goals** in mathematics which are reviewed by the students at the end of each term
- Creating opportunities for **verbal interaction** about the mathematics (share time)
- **Discussions**: Pair-Share, small group, whole class
- Modified teacher speech - Paraphrasing, repeat idea with correct vocabulary, adjust rate of speech, enunciate clearly (hundreds vs. hundredths)
- **Leveled Questions**-Adjusting questioning strategies to the language and mathematics levels of students
- **Real Strategies**- Connecting concept acquisition using real world objects (real life problem solving
- Use **anecdotal notes** made when working with small groups to create flexible groupings for different foci
- Use **observation, feedback and specific targeting** to move children forward with skill development

	GRADE 1- Expected Standards for the End of the Year	NY	Sometimes	Always
Statistics & Probability	Can represent data using pictographs where one picture represents one data value			
	Understands that representing data can help us make sense of that data (by categorising, giving information about most, least etc)			
	Contributes to class pictographs where each student contributes one picture			
	Understands the one-to-one nature of the data and its representation			
	Understands that data can be represented in different ways (objects, pictures, words, symbols)			
	Can organise information from a list into a table or pictograph as a class			
	Can read information from lists, tables and graphs and convey the in simple graphs			
	Can make connections between lists, tables and pictographs			
	Understands that the same information can be represented in different ways (lists, charts, tables, diagrams, pictographs, bar charts with a column for each student, on the Interactive Whiteboard			
	Can make simple statements or write simple sentences about what is represented by the data (eg. 3 children travel to school by bus)			
	Can identify outcomes from familiar chance events and describe using everyday language such as yes, no, maybe (eg. Is it likely that it will rain today?)			
	Can recognise that many familiar events have particular possible outcomes			
	Can talk about familiar events in terms of likely and unlikely (eg. We are going to read today- likely)			
	Can record chance events on a die, recording the numbers that are thrown			
	Can explain why they think something is likely or unlikely to happen			

GRADE 1 EXPLICIT TEACHING STRATEGIES- Statistics and Probability

- Daily 1.0hour numeracy block including a whole-small-whole organisation with a ratio of 15 minute explicit introduction to the lesson as a whole class, breaking into an independent activity or rotational open-ended activities (with the teacher working explicitly with a small group targeting the needs of students and moving them forward in their learning, scaffolding the development of necessary skills) and then back to the whole group for 15 minutes to recap and share experiences and learning.
- Teach students to predict outcomes of chance events and develop the use of qualitative terms and in tasks to collect simple categorical and numerical data and represent this data in pictographs and simple bar graphs
- *Contextual Clues* – hands-on and visual support makes the language of math more comprehensible. For example, a lesson about fractions using manipulatives is more understandable, rather than explaining the concept.
- *Verbal Interaction* – providing students with opportunities to work together to solve problems. They need to give and receive information, along with completing authentic tasks working together using English.
- *Active Participation* – requiring active involvement in math activities motivates students, engages them in the learning process, and helps them remember content easier.
- Integrate educational technology tools, i.e., Mathletics, interactive math websites, and interactive computer games.
- Use chance games with dice, spinners, coins or bingo-type drawing
- Use graphic organizers to visually represent mathematical concepts.
- Respond to questions, i.e., think/pair/share, flashcards to raise over head, hand and/or body movements, individual chalkboards for solving computations.
- Integrate reading and writing about math through the use of learning journals, learning logs, and literature.
- Use visuals whenever possible to reinforce auditory instruction, i.e., charts, graphs, manipulatives, diagrams, models, real objects.

- Design multi-sensory lessons that address various student learning styles, i.e., visual, auditory, tactile, and kinesthetic.
- Model the problem solving process by talking aloud while solving problems on the overhead, chalkboard, or interactive white board to demonstrate thinking processes.
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- attend to students' preconceptions and begin instruction with what students think and know
- focus on what is to be taught, why it is taught and what mastery looks like
- encourage a culture of questioning and risk-taking within learning.
- Develop student learning goals in mathematics which are reviewed by the students at the end of each term
- Build mathematics vocabulary
- Creating opportunities for verbal interaction about the mathematics
- Discussions: Pair-Share, small group, whole class
- Modified teacher speech - Paraphrasing, repeat idea with correct vocabulary, adjust rate of speech, enunciate clearly (hundreds vs. hundredths)
- Leveled Questions-Adjusting questioning strategies to the language and mathematics levels of students
- Whole-part-whole-share organisation of math sessions

	GRADE 1- Expected Standards for the End of the Year	NY	Sometimes	Always
Measurment & Geometry	Can recognise, visualise and classify familiar 2D shapes and 3D objects			
	Can describe shapes in terms of number of corners or faces or length of sides			
	Can classify familiar 2D and 3D shapes (circle, square, rectangle, triangle, sphere, cylinder, cube)			
	Can draw and describe familiar 2D shapes			
	Can locate all objects within a collection that belong in the same group (eg. object that look like show boxes)			
	Can visualise and make reasonable attempts to make models of 3D objects (spheres, cylinders, cubes) using plasticine			
	Measures length and capacity using uniform informal units (eg. the same size straws etc)			
	Understands that in order to compare objects that the unit used to measure must be the same size for the whole measurement and that there should be no gaps or overlaps			
	Can identify the attribute being measured and explain what would be the best thing to measure it and why			
	Can compare two objects measured in the same informal units (eg. using hand spans, to measure the width of the cupboard and the width of the doorway to see if the cupboard would fit through)			
	Reads analogue and digital clocks to the half hour			
	Can describe duration using months, weeks, days and hours			
	Understands that a month is made up of many weeks and days and that events happen within this time			
	Can use a calendar to describe duration (eg. saying that it is nearly 2 months until Samuel's birthday)			
	Understands that telling the time and the time it takes to do things can be done in different ways (using counting, clock representation on analogue and digital clocks, using stop watches)			
	Can compare the time on a digital clock and an analogue clock (half hour and o'clock times)			
	Can identify the hands on an analogue clock (hour hand, minute hand, second hand)			
	Understands that an o'clock time is represented by 00 on digital clocks			
	Understands that a half past time is represented by 30 on digital clocks			
	Can recognise, describe and order Australian coins (5c, 10c, 20c, 50c, $1, $2)			
	Recognises coins by size, markings and colour			
	Understands that coins have different values			
	Understands that the size of a coin is not related to the value of the coin			
	Can identify something that they could buy with particular coins			
	Can give simple directions to familiar locations within the classroom and school building			
	Can follow simple directions to familiar locations within the classroom and school building			
	Understands why directions are important			
	Can identify left and right			
	Understands the concept of clockwise and anticlockwise			

GRADE 1 EXPLICIT TEACHING STRATEGIES-
Measurement and Geometry

- Daily 1.0hour numeracy block including a whole-small-whole organisation with a ratio of 15 minute explicit introduction to the lesson as a whole class, breaking into an independent activity or rotational open-ended activities (with the teacher working explicitly with a small group targeting the needs of students and moving them forward in their learning, scaffolding the development of necessary skills) and then back to the whole group for 15 minutes to recap and share experiences and learning.
- Engage students in identifying and representing surfaces, planes, corners, boundaries and a range of 2D and 3D shapes and objects to classify shapes according to different features
- Engage students in identifying and using symmetry, asymmetry, congruence and transformation of shapes to complete pictures or patterns
- Teach location as a relative position (including left and right) on simple maps
- Teach students the concepts of volume, mass, time, weight and temperature and use formal units for measuring time, capacity and length and informal units for mass and capacity
- Explicitly model and teach students to read the time (hour and o'clock times) on both analogue and digital clock faces to ensure correlation
- *Contextual Clues* – hands-on and visual support makes the language of math more comprehensible. For example, a lesson about fractions using manipulatives is more understandable, rather than explaining the concept.
- *Verbal Interaction* – providing students with opportunities to work together to solve problems. They need to give and receive information, along with completing authentic tasks working together using English.
- *Active Participation* – requiring active involvement in math activities motivates students, engages them in the learning process, and helps them remember content easier.
- Review mathematical vocabulary and concepts using math games, examples include Tic-Tac-Toe, bingo, and concentration.
- Integrate educational technology tools, i.e., Mathletics, interactive math websites, and interactive computer games.
- Integrate hands-on activities by using manipulatives, real life materials, and calculators.
- Respond to questions, i.e., think/pair/share, flashcards to raise over head, hand and/or body movements, individual chalkboards for solving computations.
- Integrate reading and writing about math through the use of learning journals, learning logs, and literature.
- Use graphic organizers to visually represent concepts.
- Use visuals whenever possible to reinforce auditory instruction, i.e., charts, graphs, manipulatives, diagrams, models, real objects.
- Design multi-sensory lessons that address various student learning styles, i.e., visual, auditory, tactile, and kinesthetic.
- Model the problem solving process by talking aloud while solving problems on the overhead, chalkboard, or interactive white board to demonstrate thinking processes.
- Encourage students to use mathematics picture dictionary of terms and concepts or online maths dictionaries at www.coolmath.com
- Hands on math tasks
- Effective teaching aids for math include chalk boards, coins, Legos and colored markers. Discover how to make math a more visual endeavor with help from a math teacher
- Manipulatives- Connecting concept acquisition using specially designed blocks, unifix, MAB, sticks, bundles, place value charts, fraction conversion charts
- Use mathematic language
- attend to students' preconceptions and begin instruction with what students think and know
- focus on what is to be taught, why it is taught and what mastery looks like
- encourage a culture of questioning and risk-taking within learning.
- Develop student learning goals in mathematics which are reviewed by the students at the end of each term
- Build mathematics vocabulary
- Creating opportunities for verbal interaction about the mathematics
- Discussions: Pair-Share, small group, whole class
- Modified teacher speech - Paraphrasing, repeat idea with correct vocabulary, adjust rate of speech, enunciate clearly (hundreds vs. hundredths)

GRADE TWO

	GRADE 2- Expected Standards for the End of the Year	NY	Sometimes	Always
Number & Algebra	Can count and write most numbers to 1000 in sequence from different starting points			
	Can count by 1s, 2, 3s, 4s, 5s, 10s, 20s to 100 and beyond			
	Can accurately recall times tables x1, x2, x3, x4, x5, x10 x11			
	Can complete mental addition and subtraction facts to 20 with automatic response			
	Can complete addition and subtraction to 100 with carrying/trading			
	Can recognise all Australian coins and notes and use these to complete simple calculations			
	Can order numbers to 1000 from biggest to smallest or from smallest to biggest			
	Can complete number patterns with numbers to 1000 (eg. 56, 66, 76, 86, 96…)			
	Can group collections of coins into like groups and then count the total in the collection (eg. put all $2 coins together and count by 2s to ascertain how much money is there)			
	Labels parts of a fraction (eg. sandwich cut into quarters and one has been eaten. The label would be 3/4			
	Can identify half of a collection of familiar objects, including the recognition of ½ when sharing an odd number of objects (eg. a collection of pencils, marbles, cards etc)			
	Can describe simple fractions such as one half, one third, and one quarter (as parts of one whole)			
	Can recognise and interpret common uses of halves, quarters and thirds of everyday shapes, objects and collections (eg. food, sharing collections)			
	Understands that the more pieces an object is broken in to, the less each person gets (eg. folding a paper strip into halves, then quarters)			
	Can add and subtract two digit numbers by counting on or counting back from the largest number			
	Can identify doubles and near doubles			
	Can identify that simple multiplication facts are also repeated additions (eg. 3x5 is the same as 5+5+5)			
	Can recognise, model and read numbers on a number chart, on a calculator and in other everyday contexts (eg. on a 100 frame, sticks, bundles, unifix, MAB, icypole sticks) and explain reasoning			
	Can order numbers to 200 using number lines, number tracks and number charts			
	Can group numbers (place value) according to hundreds, tens and units (eg. 123 = 100+20+3)			
	Can demonstrate understanding of 3 digit numbers by explaining what each digit represents (eg. 543- there are 5 hundreds, 4 tens and 3 units)			
	Understands that numbers can be thought of in different ways (eg. 80 as 79 and 1, 70 + 10 or 8 tens)			
	Can make models and represent simple multiplication problems (groups of, arrays, sharing)			
	Can continue, copy, create and describe patterns with numbers, including missing elements (eg. 1,3,5,9- 7 is missing)			
	Can use the constant addition feature on a calculator and describe the patterns observed			

GRADE 2 EXPLICIT TEACHING STRATEGIES-
Number and Algebra

- **Daily 1.0hour numeracy block** including a whole-small-whole organisation with a ratio of 15 minute explicit introduction to the lesson as a **whole class (focusing and promoting/articulating the math vocab needed)**, breaking into an **independent activity** or rotational open-ended activities (with the teacher working explicitly with a **small group targeting the needs of students** and moving them forward in their learning, scaffolding the development of necessary skills) and then back to the whole group for 15 minutes to recap and **share experiences** and learning.
- **Modelled Mathematics**- The teacher introduces the learning experience, modelling and describing effective strategies, manipulating materials and recording the mathematics, making explicit the mathematics to be focussed on in the session. Use sentence starters like "watch me while I…", "Do you remember how we….?", "Listen while I explain…" (Use in first day of the week to introduce new math concepts or to link in new concepts with those skills already learnt.
- **Shared Mathematics**- The teacher and the students work together through the learning process. The teacher prompts the students, questioning and supporting them as they reinforce, modify and extend their skills and understandings. The students ask questions and suggest strategies. Use prompts eg. "Today we are looking at…", "What do you know about…?", "Tell me about…"
- **Guided Mathematics**- The teacher plays a guiding role in a small focus group (as with guided reading) as they think, talk and work their way through a mathematical experience
- **Independent Mathematics**- Carefully planned activities or activity that the students move on to one the whole class focus session has been completed. This could include small rotating group, focussing on the needs/abilities of different groups of students relating to the topic explored, or one whole open-ended task related to the topic which takes into account the different needs within the group.
- **Math Learning Experiences**- real life simulations that bring into practice the skills focused on for the week (eg. baking a cake for a focus on measurement, with children measuring out ingredients)
- **Link big book or shared text into math learning** (eg. who sank the boat)

- Model, represent and order numbers to 1000 including skip counting
- Teach students to recognise patterns through the use of 100s charts
- Encourage children to use a four function calculator
- Encourage students to describe simple fractions in relation to familiar objects
- Give opportunities for students to practice simple money calculations
- **Sequence activities** to build on skills and from previous tasks
- **Contextual Clues** – hands-on and visual support makes the language of math more comprehensible. For example, a lesson about fractions using manipulatives is more understandable, rather than explaining the concept.
- **Verbal Interaction** – providing students with opportunities to work together to solve problems. They need to give and receive information, along with completing authentic tasks working together using English.
- **Active Participation** – requiring active involvement in math activities motivates students, engages them in the learning process, and helps them remember content easier.
- Teach students to **identify key words** for solving word problems and identifying mathematical operations.
- Review **mathematical vocabulary** and concepts using math games, examples include Tic-Tac-Toe, bingo, and concentration.
- Integrate educational **technology tools**, i.e., Mathletics, interactive math websites, and interactive computer games.
- Integrate **hands-on activities** by using manipulatives, real life materials, and calculators.
- **Respond to questions**, i.e., think/pair/share, flashcards to raise over head, hand and/or body movements, individual chalkboards for solving computations.
- Integrate reading and writing about math through the use of learning journals, **learning logs**, and literature.
- Use **graphic organizers** to visually represent mathematical concepts.
- Use **visuals** whenever possible to reinforce auditory instruction, i.e., charts, graphs, manipulatives, diagrams, models, real objects.
- Design **multi-sensory lessons** that address various student learning styles, i.e., visual, auditory, tactile, and kinesthetic.

- Use **math cloze** exercises or sentence prompts
- **Model the problem solving process** by talking aloud while solving problems on the overhead, chalkboard, or interactive white board to demonstrate thinking processes.
- Encourage students to use **mathematics picture dictionary** of terms and concepts or online maths dictionaries at www.coolmath.com
- Draw sketches, drawings, and models to see the problem.
- **Make connections**-Is the word problem similar to a previous work, if so how was it solved?
- **Work the problem in reverse** or backwards, starting with the answer to see if you wind up with your original problem.
- **Games** for tuning in
- Look for what is needed **solve the problem**, for example: how many will are left, the total will be, everyone gets red, everyone gets one of each, etc.
- **Effective teaching aids** for math include chalk boards, coins, Legos and colored markers. Discover how to make math a more visual endeavor with help from a math teacher
- **Manipulatives**- Connecting concept acquisition using specially designed blocks, unifix, MAB, sticks, bundles, place value charts, fraction conversion charts

- Encourage a culture of **questioning and risk-taking** within learning.
- Develop **student learning goals** in mathematics which are reviewed by the students at the end of each term
- Creating opportunities for **verbal interaction** about the mathematics (share time)
- **Discussions**: Pair-Share, small group, whole class
- Modified teacher speech - Paraphrasing, repeat idea with correct vocabulary, adjust rate of speech, enunciate clearly (hundreds vs. hundredths)
- **Leveled Questions**-Adjusting questioning strategies to the language and mathematics levels of students
- **Real Strategies**- Connecting concept acquisition using real world objects (real life problem solving
- Use **anecdotal notes** made when working with small groups to create flexible groupings for different foci
- Use **observation, feedback and specific targeting** to move children forward with skill development

		GRADE 2- Expected Standards for the End of the Year	NY	Sometimes	Always
S t a t i s t i c s & P r o b a b i l i t y		Can independently record data and use tallies and represent data using tables, pictographs, column graphs and simple bar graphs			
		Can understand that the same data can be represented in different forms but still hold the same information			
		Can sort a list of data into an organised table using tallies			
		Can explain interpretations from simple graphs using "the least popular is ….because", "the most popular is …. because"			
		Can discuss the difference in outcome through using different chance indicators (use of dice, pulling balls from a jar, pulling out numbers from a tub, tossing a coin, turning a card over from a deck, using a spinner)			
		Can play board games that rely on the use of chance to win eg. throwing a dice or using a spinner, understanding that the winner may be different each time the game is played			
		Uses dice, playing cards, coins and spinners play chance games			
		Can justify outcomes as likely, unlikely, certain or impossible			
		Can participate in discussions to decide if something is likely or unlikely to occur through knowledge of own experiences and familiar events			
		Can record chance events on a die, recording the numbers that are thrown			

GRADE 2 EXPLICIT TEACHING STRATEGIES- Statistics and Probability

- Daily 1.0hour numeracy block including a whole-small-whole organisation with a ratio of 15 minute explicit introduction to the lesson as a whole class, breaking into an independent activity or rotational open-ended activities (with the teacher working explicitly with a small group targeting the needs of students and moving them forward in their learning, scaffolding the development of necessary skills) and then back to the whole group for 15 minutes to recap and share experiences and learning.
- Teach students to predict outcomes of chance events and develop the use of qualitative terms and in tasks to collect simple categorical and numerical data and represent this data in pictographs and simple bar graphs
- *Contextual Clues* – hands-on and visual support makes the language of math more comprehensible. For example, a lesson about fractions using manipulatives is more understandable, rather than explaining the concept.
- *Verbal Interaction* – providing students with opportunities to work together to solve problems. They need to give and receive information, along with completing authentic tasks working together using English.
- *Active Participation* – requiring active involvement in math activities motivates students, engages them in the learning process, and helps them remember content easier.
- Integrate educational technology tools, i.e., Mathletics, interactive math websites, and interactive computer games.
- Use chance games with dice, spinners, coins or bingo-type drawing
- Use graphic organizers to visually represent mathematical concepts.
- Respond to questions, i.e., think/pair/share, flashcards to raise over head, hand and/or body movements, individual chalkboards for solving computations.
- Integrate reading and writing about math through the use of learning journals, learning logs, and literature.

- Use visuals whenever possible to reinforce auditory instruction, i.e., charts, graphs, manipulatives, diagrams, models, real objects.
- Design multi-sensory lessons that address various student learning styles, i.e., visual, auditory, tactile, and kinesthetic.
- Model the problem solving process by talking aloud while solving problems on the overhead, chalkboard, or interactive white board to demonstrate thinking processes.
- Encourage students to use mathematics picture dictionary of terms and concepts or online maths dictionaries at www.coolmath.com
- Hands on math tasks
- Effective teaching aids for math include chalk boards, coins, Legos and colored markers. Discover how to make math a more visual endeavor with help from a math teacher
- Manipulatives- Connecting concept acquisition using specially designed blocks, unifix, MAB, sticks, bundles, place value charts, fraction conversion charts
- Use mathematic language
- attend to students' preconceptions and begin instruction with what students think and know
- focus on what is to be taught, why it is taught and what mastery looks like
- encourage a culture of questioning and risk-taking within learning.
- Develop student learning goals in mathematics which are reviewed by the students at the end of each term
- Build mathematics vocabulary
- Creating opportunities for verbal interaction about the mathematics
- Discussions: Pair-Share, small group, whole class
- Modified teacher speech - Paraphrasing, repeat idea with correct vocabulary, adjust rate of speech, enunciate clearly (hundreds vs. hundredths)
- Leveled Questions-Adjusting questioning strategies to the language and mathematics levels of students

	GRADE 2- Expected Standards for the End of the Year	NY	Sometimes	Always
M e a s u r e m e n t & G e o m e t r y	Can recognise o'clock, half past, quarter to and quarter past on an analogue clock			
	Can identify the number of minutes in the hour, half hour and quarter hour			
	Can use a calendar to identify the date			
	Can name and order the months of the year and the seasons independently			
	Can investigate the seasons according to different cultures (including those used by Indigenous people) and compare those with those used in western society- differences between southern and northern hemisphere			
	Can identify equivalent $ amounts for coins and notes (eg. $1 can be made of 2x50c coins)			
	Can make, describe and compare measurements of length, area, volume, mass and time using informal units and simple formal units (eg. timer, ruler, balance scales)			
	Can recognise the difference between non-uniform measures, such as hand spans to measure length			
	Can describe temperature in terms of hot, cold and warm			
	Can use the term 'litres' for measuring capacity			
	Can use the term 'kilograms' when weighing objects			
	Can use the term 'seconds' when measuring the time taken to complete tasks			
	Can describe features of 2D and 3D shapes			
	Can draw and make 3D shapes from nets, sticks and plasticine			
	Can classify 2D and 3D shapes such as sorting circles, triangles, squares and rectangles into groups using features such as straight sides, curved edge			
	Can describe the properties of 3D shapes including discussing faces, edges, vertices and corners			
	Can match the attribute being measured to the correct tool used for measuring (eg. the length of the table is measured with a ruler, the amount of water is measured using a jug, which is heavier is measured using balance scales)			
	Uses metres and centimetres to measure familiar objects within the classroom			
	Can compare the area of regular and irregular shapes by covering shapes with a repeated object (eg. MAB mini's to cover a shape without gaps)			
	Can compare the area of two objects such as a book and a folder and saying the folder is larger because the book fits inside it			
	Predicts and draws (on grid paper) the effect of 1-step sliding, flipping and turning of familiar shapes and objects			
	Can identify half and quarter turns from any starting point			
	Uses ICT to create flips, slides and turns of graphics in a word document			
	Can interpret simple maps of familiar locations such as the classroom to identify the position of key features and to help students give directions to certain objects within the room			

GRADE 2 EXPLICIT TEACHING STRATEGIES- Measurement and Geometry

- Daily 1.0hour numeracy block including a whole-small-whole organisation with a ratio of 15 minute explicit introduction to the lesson as a whole class, breaking into an independent activity or rotational open-ended activities (with the teacher working explicitly with a small group targeting the needs of students and moving them forward in their learning, scaffolding the development of necessary skills) and then back to the whole group for 15 minutes to recap and share experiences and learning.
- Engage students in identifying and representing surfaces, planes, corners, boundaries and a range of 2D and 3D shapes and objects to classify shapes according to different features
- Engage students in identifying and using symmetry, asymmetry, congruence and transformation of shapes to complete pictures or patterns
- Teach location as a relative position (including left and right) on simple maps
- Teach students the concepts of volume, mass, time, weight and temperature and use formal units for measuring time, capacity and length and informal units for mass and capacity
- Explicitly model and teach students to read the time (hour and o'clock times) on both analogue and digital clock faces to ensure correlation
- *Contextual Clues* – hands-on and visual support makes the language of math more comprehensible. For example, a lesson about fractions using manipulatives is more understandable, rather than explaining the concept.
- *Verbal Interaction* – providing students with opportunities to work together to solve problems. They need to give and receive information, along with completing authentic tasks working together using English.
- *Active Participation* – requiring active involvement in math activities motivates students, engages them in the learning process, and helps them remember content easier.
- Review mathematical vocabulary and concepts using math games, examples include Tic-Tac-Toe, bingo, and concentration.
- Integrate educational technology tools, i.e., Mathletics, interactive math websites, and interactive computer games.

- Integrate hands-on activities by using manipulatives, real life materials, and calculators.
- Respond to questions, i.e., think/pair/share, flashcards to raise over head, hand and/or body movements, individual chalkboards for solving computations.
- Integrate reading and writing about math through the use of learning journals, learning logs, and literature.
- Use graphic organizers to visually represent mathematical concepts.
- Use visuals whenever possible to reinforce auditory instruction, i.e., charts, graphs, manipulatives, diagrams, models, real objects.
- Design multi-sensory lessons that address various student learning styles, i.e., visual, auditory, tactile, and kinesthetic.
- Model the problem solving process by talking aloud while solving problems on the overhead, chalkboard, or interactive white board to demonstrate thinking processes.
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- attend to students' preconceptions and begin instruction with what students think and know
- focus on what is to be taught, why it is taught and what mastery looks like
- encourage a culture of questioning and risk-taking within learning.
- Develop student learning goals in mathematics which are reviewed by the students at the end of each term
- Build mathematics vocabulary
- Creating opportunities for verbal interaction about the mathematics
- Discussions: Pair-Share, small group, whole class
- Modified teacher speech - Paraphrasing, repeat idea with correct vocabulary, adjust rate of speech, enunciate clearly (hundreds vs. hundredths)

- Leveled Questions-Adjusting questioning strategies to the language and mathematics levels of students

- Real Strategies- Connecting concept acquisition using real world objects

GRADE THREE

	GRADE 3 - Expected Standards for the End of the Year	NY	Sometimes	Always
N u m b e r & A l g e b r a	Can count, write and represent by 1s, 2s, 3s, 4s, 5s, 10s and 20s to 1000 and beyond from different starting points			
	Addition and subtraction of amounts of money including the calculation of change of $10			
	Can write number names (eg. five, twenty-eight)			
	Can recognise all notes and coins			
	Can automatically recall times table facts x1, x2, x3, x4, x5, x9, x10, 11			
	Can mentally compute addition and subtraction to at least 20			
	Uses strategies such as 'near doubles', 'adding 9' and 'build to the next 10' to solve + and - problems			
	Can solve worded problems involving answers to 100 and beyond			
	Writes number sentences to represent a worded problem			
	Uses fractions to represent parts of a whole (1/4, ½. 1/3, 1/8, 1/6)			
	Can identify simple equivalent fractions (eg. 2/8 = ¼, ½ = 4/8)			
	Uses fractions with numerators other than one (eg. 4/6, 3/9)			
	Understands that 1/3 is smaller than ½ because it is broken into 3 pieces (the smaller the denominator that bigger the section)			
	Understands that fractions have a numerator and a denominator			
	Can round money amounts to the nearest dollar (eg. 99c to $1, $2.02 to $2.00)			
	Use of place value to explain that 10 of those equals 1 of those (eg. 10 units = 1 ten) to 100			
	Understands and creates number sequences with increasing and decreasing numbers by 2s, 5s and 10s from different starting points			
	Can predict missing numbers in 2,5 and 10 patterns to 100 and beyond and explain reasoning			
	Expands 3 digit numbers (eg. 678 is 600+70+8 or 6 hundreds, 7 tens and 8 units)			
	Understands groupings of tens (eg. 1 group of tens is 10, ten groups of ten is one hundred, ten hundreds are a thousand)			
	Can describe the composition of 3 and 4 digit numbers (eg. 1000= 1000 ones, 100 tens, 10 hundreds, 90 tens + 100 ones)			
	Solves vertical and horizontal addition and subtraction problems with trading and carrying			
	Can choose from a range of mental strategies to help solve specific problems (eg. counting on, counting back, near doubling, bridging to 10, estimation, rounding) and can give reasons for their choice of strategy			
	Can model word problems using symbols and/or concrete materials to help solve them			
	Solves simple division, multiplication, addition and subtraction problems (3 digits)			
	Understands that multiplication facts = the same answer no matter where the digit (3x10=30, 10x3=30)- equivalent			
	Understands that division facts are not equivalent (eg. 20÷10=2 by 10÷20 does not give the same answer)			

GRADE 3 EXPLICIT TEACHING STRATEGIES-
Number and Algebra

- **Daily 1.0hour numeracy block** including a whole-small-whole organisation with a ratio of 15 minute explicit introduction to the lesson as a **whole class (focusing and promoting/articulating the math vocab needed)**, breaking into an **independent activity** or rotational open-ended activities (with the teacher working explicitly with a **small group targeting the needs of students** and moving them forward in their learning, scaffolding the development of necessary skills) and then back to the whole group for 15 minutes to recap and **share experiences** and learning.
- **Modelled Mathematics**- The teacher introduces the learning experience, modelling and describing effective strategies, manipulating materials and recording the mathematics, making explicit the mathematics to be focussed on in the session. Use sentence starters like "watch me while I…", "Do you remember how we….?", "Listen while I explain…" (Use in first day of the week to introduce new math concepts or to link in new concepts with those skills already learnt.
- **Shared Mathematics**- The teacher and the students work together through the learning process. The teacher prompts the students, questioning and supporting them as they reinforce, modify and extend their skills and understandings. The students ask questions and suggest strategies. Use prompts eg. "Today we are looking at…", "What do you know about…?", "Tell me about…"
- **Guided Mathematics**- The teacher plays a guiding role in a small focus group (as with guided reading) as they think, talk and work their way through a mathematical experience
- **Independent Mathematics**- Carefully planned activities or activity that the students move on to one the whole class focus session has been completed. This could include small rotating group, focussing on the needs/abilities of different groups of students relating to the topic explored, or one whole open-ended task related to the topic which takes into account the different needs within the group.
- **Math Learning Experiences**- real life simulations that bring into practice the skills focused on for the week (eg. baking a cake for a focus on measurement, with children measuring out ingredients)
- Teach structure and place value including skip counting

- Engage students in representing, finding, comparing, ordering, adding and subtracting simple fractions and decimals
- Build on students understanding of addition, subtraction, multiplication and division
- Encourage children to test number patterns
- Teach the meaning of the equals sign as equivalence
- Teach students to interpret number sentences
- *Contextual Clues* – hands-on and visual support makes the language of math more comprehensible. For example, a lesson about fractions using manipulatives is more understandable, rather than explaining the concept.
- *Verbal Interaction* – providing students with opportunities to work together to solve problems. They need to give and receive information, along with completing authentic tasks working together using English.
- *Active Participation* – requiring active involvement in math activities motivates students, engages them in the learning process, and helps them remember content easier.
- Provide explicit instructions and practice with reading and writing word problems. Teach students to identify key words for solving word problems and identifying mathematical operations.
- Review mathematical vocabulary and concepts using math games, examples include Tic-Tac-Toe, bingo, and concentration.
- Integrate educational technology tools, i.e., Mathletics, interactive math websites, and interactive computer games.
- Integrate hands-on activities by using manipulatives, real life materials, and calculators.
- Respond to questions, i.e., think/pair/share, flashcards to raise over head, hand and/or body movements, individual chalkboards for solving computations.
- Integrate reading and writing about math through the use of learning journals, learning logs, and literature.
- Use graphic organizers to visually represent mathematical concepts.
- Use visuals whenever possible to reinforce auditory instruction, i.e., charts, graphs, manipulatives, diagrams, models, real objects.
- Design multi-sensory lessons that address various student learning styles, i.e., visual, auditory, tactile, and kinesthetic.
- Use math cloze exercises or sentence prompts

- Model the problem solving process by talking aloud while solving problems on the overhead, chalkboard, or interactive white board to demonstrate thinking processes.
- Encourage students to use mathematics picture dictionary of terms and concepts or online maths dictionaries at www.coolmath.com
- Draw sketches, drawings, and models to see the problem.
- Make connections-Is the word problem similar to a previous work, if so how was it solved?
- Develop a plan based on the information determined to be important for solving the problem. Carry out the plan using the math operations which were determined would find the answer.
- Work the problem in reverse or backwards, starting with the answer to see if you wind up with your original problem.
- Games for tuning in
- Look for clues to determine which math operation is needed to solve the problem, for example addition, subtraction, etc. Look for key words like sum, difference, product, perimeter, area, etc. They lead to the operation needed to solve the problem.
- Look for what is needed solve the problem, for example: how many will are left, the total will be, everyone gets red, everyone gets one of each, etc.
- Effective teaching aids for math include chalk boards, coins, Legos and colored markers. Discover how to make math a more visual endeavor with help from a math teacher

- Manipulatives- Connecting concept acquisition using specially designed blocks, unifix, MAB, sticks, bundles, place value charts, fraction conversion charts
- Use mathematic language
- attend to students' preconceptions and begin instruction with what students think and know
- focus on what is to be taught, why it is taught and what mastery looks like
- encourage a culture of questioning and risk-taking within learning.
- Develop student learning goals in mathematics which are reviewed by the students at the end of each term
- Build mathematics vocabulary
- Creating opportunities for verbal interaction about the mathematics
- Discussions: Pair-Share, small group, whole class
- Modified teacher speech - Paraphrasing, repeat idea with correct vocabulary, adjust rate of speech, enunciate clearly (hundreds vs. hundredths)
- Leveled Questions-Adjusting questioning strategies to the language and mathematics levels of students
- Real Strategies- Connecting concept acquisition using real world objects

	GRADE 3- Expected Standards for the End of the Year	NY	Sometimes	Always
S t a t i s t i c s & P r o b a b i l i t y	Can identify which events are equally likely and give reasons			
	Can investigate data-oriented questions about familiar situations (eg. How many people coloured their hair blue on crazy hair day?)			
	Can predict what the data might show			
	Can carry out the investigation			
	Can represent the data in a variety of ways (tables, pictograph, bar graph, line graph, column graph, dot plots)			
	Can report to the class on steps taken to collect data			
	Can pose simple questions about familiar events for the class to investigate which is then presented in graphs and tables (eg. what are the most popular type of books borrowed at the library?)			
	Can pose chance questions and investigate (eg.How likely is it that 90% of the class would walk to school?)			
	Represents results using technology, including making tables and graphs			
	Makes and articulates conclusions based on data rather than on personal experiences			
	Constructs, reads and makes connections between tables, diagrams, labels and graphs			
	Understands that graphs need a base line, regular intervals, labelled axis and a title			
	Can compare data collected by several students			
	Can create pictographs and dot plots with one picture or dot representing more than one (ratios) with a key at the bottom of the graph eg. 1 ☺ = 10			
	Can conduct chance experiments and recognise that there will be a variation in the results			
	Can conduct repeated trials of chance experiments (eg. tossing a coin, rolling a dice, drawing a ball from a bag) and notices the variation between trials			
	Can record the results from multiple trials of chance experiments			
	Can predict likely sets of outcomes from a set of chance events			

GRADE 3 EXPLICIT TEACHING STRATEGIES- Statistics and Probability

- Daily 1.0hour numeracy block including a whole-small-whole organisation with a ratio of 15 minute explicit introduction to the lesson as a whole class, breaking into an independent activity or rotational open-ended activities (with the teacher working explicitly with a small group targeting the needs of students and moving them forward in their learning, scaffolding the development of necessary skills) and then back to the whole group for 15 minutes to recap and share experiences and learning.
- Engage students in conducting chance experiments that use the concept of fairness in events (experimental estimates of probability)
- Teach the recognition of different types of data
- Engage students in using all possible outcomes of a simple change event (look a samples, subsets etc)
- *Contextual Clues* – hands-on and visual support makes the language of math more comprehensible. For example, a lesson about fractions using manipulatives is more understandable, rather than explaining the concept.
- *Verbal Interaction* – providing students with opportunities to work together to solve problems. They need to give and receive information, along with completing authentic tasks working together using English.
- *Active Participation* – requiring active involvement in math activities motivates students, engages them in the learning process, and helps them remember content easier.
- Integrate educational technology tools, i.e., Mathletics, interactive math websites, and interactive computer games.
- Use chance games with dice, spinners, coins or bingo-type drawing
- Use graphic organizers to visually represent mathematical concepts.
- Respond to questions, i.e., think/pair/share, flashcards to raise over head, hand and/or body movements, individual chalkboards for solving computations.
- Integrate reading and writing about math through the use of learning journals, learning logs, and literature.

- Use visuals whenever possible to reinforce auditory instruction, i.e., charts, graphs, manipulatives, diagrams, models, real objects.
- Design multi-sensory lessons that address various student learning styles, i.e., visual, auditory, tactile, and kinesthetic.
- Model the problem solving process by talking aloud while solving problems on the overhead, chalkboard, or interactive white board to demonstrate thinking processes.
- Encourage students to use mathematics picture dictionary of terms and concepts or online maths dictionaries at www.coolmath.com
- Hands on math tasks
- Effective teaching aids for math include chalk boards, coins, Legos and colored markers. Discover how to make math a more visual endeavor with help from a math teacher
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	GRADE 3- Expected Standards for the End of the Year	NY	Sometimes	Always
M e a s u r m e n t & G e o m e t r y	Can estimate and measure mass, volume and capacity of common objects in kilograms and litres			
	Can use a ruler, tape measure and trundle wheel to validate estimates in length			
	Can use informal units to measure length (eg. hand spans, pace length, arm span, foot) and compare using formal measurement units in metres and centimetres			
	Can observe that the order of objects may change depending on the attribute being compared (eg. first lining objects up by height, then lining them up by weight- this may change the order)			
	Can measure and compare areas using uniform informal units, explaining reasoning in everyday language			
	Uses terms such as "bigger", "smaller" or "covers more" to compare areas			
	Uses indirect comparisons to compare areas (eg. counting the number of the same book required to cover two tables)			
	Reads analogue and digital clocks to the five minutes			
	Compares and orders events according to their duration			
	Can construct and interpret a daily timetable			
	Uses the terms 'hour', 'minute' and 'second' accurately when describing events			
	Can use a timer (eg. egg timer, stop watch) to measure the time it takes to complete an activity or task			
	Understands that there are equivalent ways of saying the time and that some are more useful than others (eg. 55 minutes past 9 vs 5 minutes to 10.)			
	Reads and matches times on analogue and digital clock faces to 5 minute intervals			
	Orders and compares the time it takes to complete different tasks (eg. boiling an egg will take 4 minutes whereas it will take 10 minute to cook a sausage)			
	Can order the duration of events using start and finishing times or dates (eg. races, school terms, holiday)			
	Recognises and uses appropriately all Australian coins and notes in change situations			
	Can calculate the cost of 2-3 items wanting to purchase by adding values together ($4.30+ $2.00= $6.30)			
	Can create angles and recognise that equivalence in angles such as two quarter turns is the same as a straight angle and that a half turn is the same as 30 minutes on an analogue clock			
	Understands the difference between clockwise and anticlockwise			
	Can recognise acute, obtuse and right angles			
	Can create simple maps to show positions and pathways between objects			
	Can represent familiar places as a birds-eye view (eg. bedroom, classroom)			
	Can design a maze with directions to locate items within the maze			
	Can create maps that include roads, waterways, houses, parks, shops, sporting grounds			
	Can create internal map layouts by labelling furniture or rooms within the building including a simple key			
	Can describe orientation of north, south, east and west			

GRADE 3 EXPLICIT TEACHING STRATEGIES-
Measurement and Geometry

- Daily 1.0hour numeracy block including a whole-small-whole organisation with a ratio of 15 minute explicit introduction to the lesson as a whole class, breaking into an independent activity or rotational open-ended activities (with the teacher working explicitly with a small group targeting the needs of students and moving them forward in their learning, scaffolding the development of necessary skills) and then back to the whole group for 15 minutes to recap and share experiences and learning.
- Engage students in recognising, describing and representing properties (straight, curved, diagonal, horizontal and vertical lines)
- Engage students in making nets for 3D objects, counting faces, edges and vertices
- Engage students in estimating and measuring area, length, volume, capacity, mass and time using everyday measuring instruments
- Teach students to read analogue and digital clocks to five minute intervals, interpret timetables and calendars
- *Contextual Clues* – hands-on and visual support makes the language of math more comprehensible. For example, a lesson about fractions using manipulatives is more understandable, rather than explaining the concept.
- *Verbal Interaction* – providing students with opportunities to work together to solve problems. They need to give and receive information, along with completing authentic tasks working together using English.
- *Active Participation* – requiring active involvement in math activities motivates students, engages them in the learning process, and helps them remember content easier.
- Review mathematical vocabulary and concepts using math games, examples include Tic-Tac-Toe, bingo, and concentration.
- Integrate educational technology tools, i.e., Mathletics, interactive math websites, and interactive computer games.
- Integrate hands-on activities by using manipulatives, real life materials, and calculators.
- Respond to questions, i.e., think/pair/share, flashcards to raise over head, hand and/or body movements, individual chalkboards for solving computations.

- Integrate reading and writing about math through the use of learning journals, learning logs, and literature.
- Use graphic organizers to visually represent mathematical concepts.
- Use visuals whenever possible to reinforce auditory instruction, i.e., charts, graphs, manipulatives, diagrams, models, real objects.
- Design multi-sensory lessons that address various student learning styles, i.e., visual, auditory, tactile, and kinesthetic.
- Model the problem solving process by talking aloud while solving problems on the overhead, chalkboard, or interactive white board to demonstrate thinking processes.
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GRADE FOUR

	GRADE 4- Expected Standards for the End of the Year	NY	Sometimes	Always
N **u** **m** **b** **e** **r** **&** **A** **l** **g** **e** **b** **r** **a**	Can count, write and identify numbers to 1,000,000 (eg. 32,998 is thirty two thousand, nine hundred and ninety eight)			
	Can count by decimals and fractions			
	Can round numbers up and down to the nearest unit, ten, hundred or thousand			
	Can recall times tables x1, x2, x3, x4, x5, x6, x7, x8, x9, x10, x11 automatically			
	Can complete mental computations of addition and subtraction to 1000			
	Can complete vertical addition to 10,000			
	Can complete multiplication by single digits to 10,000			
	Can complete short division with remainders			
	Can complete math cloze activities to complete number sentences (eg. □+2=9)			
	Can write number names including ordinal numbers			
	Can use place value as the idea that 10 of these is one of those (eg. 10 units = 1 ten)			
	Can determine size of whole and decimal numbers and order those numbers			
	Can read and use decimal numbers to hundredths			
	Can skip count forwards and backwards, from various starting points using multiples of 2,3,4,5,10,20,50,100 and apply this in number pattern tasks			
	Can add and subtract numbers with up to 2 decimal places			
	Uses fact families to solve division problems (eg. 5x7=35, 35÷7=5, 35÷5=7)			
	Understands the multiples of 2,5,10 and their factors			
	Can extend numbers to one million (eg. 132,544 is 100,000+ 30,000+ 2,000+ 500+ 40+ 4)			
	Can type a large number into a calculator using correct place value, including a 0 for those columns without numbers (eg. 401 043- without the 0's would show 4143 on a calculator) when the number is said aloud			
	Can add and subtract simple common fractions with concrete or pictorial aids (eg. 9/10 - 4/10= 5/10)			
	Develops fraction notation and compares common fractions such as 3/4 > 2/3 using physical models			
	Can compare and contrast everyday uses of halves, thirds, quarters, fifths, eighths and tenths			
	Understands that to add or subtract fractions they need to have the same denominator			
	Understands which is the numerator and which is the denominator in a fraction			
	Understands simple equivalent fractions (eg. 1/2 is the same as 2/4 and 4/8 and 5/10)			
	Can complete math problems involving simple fractions (eg. 1/3 of 12 = 4 and understands that this is the same as 12 ÷ 3 = 4)			
	Understands that the size of a fraction is dependent on the size of the whole (eg. 2/3 of a netball is smaller than 2/3 of a football oval)			
	Solves word problems involving fractions (eg. a box of chocolates was shared equally between eight children and three children received the only caramel chocolates. What fraction of chocolates were			

caramel?			
Can change mixed numbers into fractions (eg. 1 ½ = 3/2) and reverse this process (eg. 3/2 = 1 ½)			
Can select, explain, justify and apply mental, written strategies and use calculators to solve problems			
Can identify the correct operation or operations to solve a problem			
Can copy, continue, create, describe and identify missing elements in patterns			
Investigates and records patterns in number sequences arising from two operations (eg. two steps forward, one step back or 20 minutes per kilo plus 10 minutes)			
Uses strategies such as number machines to find output numbers of growing patterns			
Understands the commutativity of addition and multiplication (eg. a+b=b+a/ axb=bxa in other words, it doesn't matter which order the number are in you will get the same answer- this does not work with subtraction or division)			

GRADE 4 EXPLICIT TEACHING STRATEGIES-
Number and Algebra

- **Daily 1.0hour numeracy block** including a whole-small-whole organisation with a ratio of 15 minute explicit introduction to the lesson as a **whole class (focusing and promoting/articulating the math vocab needed)**, breaking into an **independent activity** or rotational open-ended activities (with the teacher working explicitly with a **small group targeting the needs of students** and moving them forward in their learning, scaffolding the development of necessary skills) and then back to the whole group for 15 minutes to recap and **share experiences** and learning.
- **Modelled Mathematics**- The teacher introduces the learning experience, modelling and describing effective strategies, manipulating materials and recording the mathematics, making explicit the mathematics to be focussed on in the session. Use sentence starters like "watch me while I…", "Do you remember how we….?", "Listen while I explain…" (Use in first day of the week to introduce new math concepts or to link in new concepts with those skills already learnt.
- **Shared Mathematics**- The teacher and the students work together through the learning process. The teacher prompts the students, questioning and supporting them as they reinforce, modify and extend their skills and understandings. The students ask questions and suggest strategies. Use prompts eg. "Today we are looking at…", "What do you know about…?", "Tell me about…"
- **Guided Mathematics**- The teacher plays a guiding role in a small focus group (as with guided reading) as they think, talk and work their way through a mathematical experience
- **Independent Mathematics**- Carefully planned activities or activity that the students move on to one the whole class focus session has been completed. This could include small rotating group, focussing on the needs/abilities of different groups of students relating to the topic explored, or one whole open-ended task related to the topic which takes into account the different needs within the group.
- **Math Learning Experiences**- real life simulations that bring into practice the skills focused on for the week (eg. baking a cake for a focus on measurement, with children measuring out ingredients)
- Teach structure and place value including skip counting

- Engage students in representing, finding, comparing, ordering, adding and subtracting simple fractions and decimals
- Build on students understanding of addition, subtraction, multiplication and division
- Encourage children to test number patterns
- Teach the meaning of the equals sign as equivalence
- Teach students to interpret number sentences
- *Contextual Clues* – hands-on and visual support makes the language of math more comprehensible. For example, a lesson about fractions using manipulatives is more understandable, rather than explaining the concept.
- *Verbal Interaction* – providing students with opportunities to work together to solve problems. They need to give and receive information, along with completing authentic tasks working together using English.
- *Active Participation* – requiring active involvement in math activities motivates students, engages them in the learning process, and helps them remember content easier.
- Provide explicit instructions and practice with reading and writing word problems. Teach students to identify key words for solving word problems and identifying mathematical operations.
- Review mathematical vocabulary and concepts using math games, examples include Tic-Tac-Toe, bingo, and concentration.
- Integrate educational technology tools, i.e., Mathletics, interactive math websites, and interactive computer games.
- Integrate hands-on activities by using manipulatives, real life materials, and calculators.
- Respond to questions, i.e., think/pair/share, flashcards to raise over head, hand and/or body movements, individual chalkboards for solving computations.
- Integrate reading and writing about math through the use of learning journals, learning logs, and literature.
- Use graphic organizers to visually represent mathematical concepts.
- Use visuals whenever possible to reinforce auditory instruction, i.e., charts, graphs, manipulatives, diagrams, models, real objects.
- Design multi-sensory lessons that address various student learning styles, i.e., visual, auditory, tactile, and kinesthetic.
- Use math cloze exercises or sentence prompts

- Model the problem solving process by talking aloud while solving problems on the overhead, chalkboard, or interactive white board to demonstrate thinking processes.
- Encourage students to use mathematics picture dictionary of terms and concepts or online maths dictionaries at www.coolmath.com
- Draw sketches, drawings, and models to see the problem.
- Make connections-Is the word problem similar to a previous work, if so how was it solved?
- Develop a plan based on the information determined to be important for solving the problem. Carry out the plan using the math operations which were determined would find the answer.
- Work the problem in reverse or backwards, starting with the answer to see if you wind up with your original problem.
- Games for tuning in
- Look for clues to determine which math operation is needed to solve the problem, for example addition, subtraction, etc. Look for key words like sum, difference, product, perimeter, area, etc. They lead to the operation needed to solve the problem.
- Look for what is needed solve the problem, for example: how many will are left, the total will be, everyone gets red, everyone gets one of each, etc.
- Effective teaching aids for math include chalk boards, coins, Legos and colored markers. Discover how to make math a more visual endeavor with help from a math teacher

- Manipulatives- Connecting concept acquisition using specially designed blocks, unifix, MAB, sticks, bundles, place value charts, fraction conversion charts
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- Leveled Questions-Adjusting questioning strategies to the language and mathematics levels of students
- Real Strategies- Connecting concept acquisition using real world objects

	GRADE 4- Expected Standards for the End of the Year	NY	Sometimes	Always
S	Uses a column or bar graph to display the results of experiments			
t	Recognises the different types of data (categories, different points on an unbroken number line, tallies)			
a	Plans and conducts chance experiments (eg. using colours on a spinner) and displays the results of these experiments			
t	Can plan and undertake surveys of the whole class with a question posed by them			
i	Can represent data and report the findings			
s	Understands that data is collected from a whole population eg. voting in order for governments to make decisions)			
t	Poses questions that can be answered by surveying a class or a whole year level			
i	Creates tables to record the data collected			
c	Makes statements after collecting data using the evidence collected (eg. 90% of Grade 4s at our school have brown eyes)			
s	Represents data through tables, column graphs, dot plots, line graphs and pie charts as appropriate, including the use of ICT			
&	Can use secondary sets of data, such as those already collected by the teacher, to answer questions (eg. What country was the most common birthplace for this class?)			
P	Can make connections between tables and simple graphs with many-to-one correspondence between data and symbols (eg. *=10 people or ☺=2 people)- understanding that it is important to read all information contained on a graph to ensure that keys are noted			
r	Can create graphs with many-to-one representation by one object or line (eg. pictographs with one symbol representing many)			
o	Can suggest a question that can be answered by a given pictograph, column graph or dot plot			
b	Describes the fairness of events in qualitative terms			
a	Compares the likelihood of everyday events (eg. the chances of rain and snow)			
b	Understands the distinction between discrete and continuous scales			
i	Predicts the outcomes of chance experiments involving equally likely events			
l	Compares and contrasts the predictability of outcomes of experiments with trials to those, including the use of ICT to generate trials			
i	Can conduct repeated trials of chance experiments and notice the variation between trials			
t	Can predict the findings of longer trials, making informed estimations based on shorter trials completed			
y	Can comment on the likelihood of winning simple games of chance by considering the number of outcomes and the consequent chance of winning			
	Can explain why outcomes of a particular event are unequal (eg. uneven number of attributes to begin with)			
	Can design and trial chance devices and discuss how the design relates to possible outcomes			

GRADE 4 EXPLICIT TEACHING STRATEGIES- Statistics and Probability

- Daily 1.0 hour numeracy block including a whole-small-whole organisation with a ratio of 15 minute explicit introduction to the lesson as a whole class, breaking into an independent activity or rotational open-ended activities (with the teacher working explicitly with a small group targeting the needs of students and moving them forward in their learning, scaffolding the development of necessary skills) and then back to the whole group for 15 minutes to recap and share experiences and learning.
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- Teach the recognition of different types of data
- Engage students in using all possible outcomes of a simple change event (look a samples, subsets etc)
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- Use visuals whenever possible to reinforce auditory instruction, i.e., charts, graphs, manipulatives, diagrams, models, real objects.
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	GRADE 4- Expected Standards for the End of the Year	NY	Sometimes	Always
Measurement & Geometry	Understands time to units of 1 minute			
	Can accurately read analogue and digital clocks			
	Understands the equivalent representations of 12-hour time			
	Can sequence daily and weekly events			
	Can accurately use a calendar to find and plot important information			
	Understands the significance of 'past' and 'to when describing times and the impact of saying the wrong time in real life situations (eg. catching a bus, train etc)			
	Explains the use of am and pm (eg. 2.00am is in the middle of the night, 2.00pm is in the afternoon)			
	Understands that minutes on a digital clock are represented by 00-59 and then a new hour begins			
	Can sequence and list in order steps required to do everyday activities (eg. getting dressed, playing sport)			
	Can recognise and describe the directions of lines as vertical, horizontal or diagonal			
	Can recognise that angles are the result of rotation of lines with a common point			
	Recognises and describes polygons			
	Recognises and names common 3D shapes including spheres, prisms and pyramids			
	Identifies edges, vertices and faces			
	Uses 2D nets, cross sections and simple projections to represent simple 3D shapes			
	Follows instructions to produce simple tessellations and puzzles such as tangrams			
	Understands that 3D shapes are made up of 2D faces			
	Can categorise 3D shapes by looking at attributes such as surface shapes, corners, edges, vertices etc			
	Can recognise, name and describe most 3D shapes			
	Locates and identifies places on maps and diagrams			
	Can give travel directions and describe positions using simple compass directions and grid references on a street directory			
	Creates, interprets and uses basic maps using simple scales (eg. 1cm=1m or 1km) and legends(pictures representing are directions such as left, right, forward and backward			
	Can use metric units to estimate, measure and compare lengths, mass and capacity of familiar objects reading scales to the nearest graduation			
	Using metric units to estimate length, mass and capacity of familiar objects			
	Can read and interpret the graduated scales on a range of measuring instruments (eg. rulers, scales, rain gauge)			
	Can compare the lengths, masses and capacities of objects directly and indirectly using measurements, and calculating the differences between measurements			
	Calculates the perimeter of shapes by adding all sides together			

GRADE 4 EXPLICIT TEACHING STRATEGIES- Measurement and Geometry

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GRADE FIVE

	GRADE 5- Expected Standards for the End of the Year	NY	Sometimes	Always
N u m b e r & A l g e b r a	Can automatically recall all times table facts 1x to12x			
	Accurately complete vertical addition to 100,000			
	Can multiply numbers involving two digits to 100,000			
	Can complete division problems with remainders			
	Creates and describes patterns, including number patterns, using calculators, sets of multiples			
	Models and identifies positive/negative whole number on a number line			
	Has a range of personal benchmarks for appreciating the size of large numbers (eg. an Olympic sized pool contains about 1 million litres of water)			
	Uses physical models and number lines to compare, rename and identify decimals (eg. 3.2 is 32 tenths)			
	Finds equivalent fractions, multiples and fractions of fractions			
	Performs more complex addition and subtraction using fraction models (incl. number lines)			
	Models percentages as fractions out of 100 (eg. 90/100 is 90%)			
	Uses fraction walls to help add and subtract fractions by finding a common denominator (eg. 3/4 and 5/8 and knowing to change 3/4 to 6/8 to be able to add them together- 6/8 + 5/8= 11/8 or 1 3/8)			
	Finds equivalences with decimals and fractions in simple cases			
	Recognises and represents numbers involving tenths, hundredths (reads, writes and orders those numbers and connects them to fractions)			
	Connects decimals with fractions (eg. 0.50 is 50/100 or 0.1 is 1/10)			
	Uses place value to compare and order numbers to two decimal places to determine the larger number			
	Reads and recognises numbers to 2 decimal places (eg. 23.57 is twenty three and fifty seven hundredths)			
	Can extend the place value pattern of grouping in tenths from whole numbers to tenths and hundredths			
	Can use the constant function on calculators to perform 100 ÷ 10 ===			
	Can describe the composition of numbers with one or two decimal places in a variety of ways (eg. 1= 10 tenths or 100 hundredths			
	Understands that there is equivalence between fractions, decimals and percentages using drawings, models or number lines			
	Using equivalences with fractions, they can calculate 50%, 25% and 10% of quantities (eg. 25% of 80 is the same as ¼ of 80 which is 20)			
	Solves realistic problems involving multiplying situations with large numbers			
	Applies a range of strategies to solve realistic problems and comments on the efficiency of these strategies			
	Understands and uses the fact that equivalent division calculations result if both numbers are divided by the same factor (eg. 250÷50 is equivalent to 25÷5)			
	Interprets and represents the remainder in division calculations sensibly for the context (eg. if we want to know how many 40 seat buses will be needed to transport 170 students for an excursion, we divide 170			

	by 40 and realise that we need 4 buses and another smaller vehicle to transport 10 more students)			
	Can apply the distributive rules of mathematics and uses arrays to model its use in multiplication and division situations and to explain calculation strategies			
	Uses estimation and rounding to check the reasonableness of answers			
	Copies, continues, creates and describes patterns with numbers and uses graphs, tables and rules to describe those patterns			
	Identifies and generalises number patterns as a beginning of algebraic thinking			
	Investigates additive and multiplicative patterns such as the number of tiles in a geometric pattern, or the number of dots, looking for patterns in the way numbers increase			
	Writes word rules that link the value of a variable to a position in the pattern (eg. the number of tiles in the pattern is four more than the step number)			
	Identifies and describes properties of numbers including factors, multiples and composites and solves problems involving properties			
	Investigates additive and multiplicative relationships between odd and even numbers to make generalisations and solve problems (eg. multiplying pairs of odd numbers to establish that the product is always odd)			

GRADE 5 EXPLICIT TEACHING STRATEGIES-
Number and Algebra

- **Daily 1.0hour numeracy block** including a whole-small-whole organisation with a ratio of 15 minute explicit introduction to the lesson as a **whole class (focusing and promoting/articulating the math vocab needed)**, breaking into an **independent activity** or rotational open-ended activities (with the teacher working explicitly with a **small group targeting the needs of students** and moving them forward in their learning, scaffolding the development of necessary skills) and then back to the whole group for 15 minutes to recap and **share experiences** and learning.
- **Modelled Mathematics**- The teacher introduces the learning experience, modelling and describing effective strategies, manipulating materials and recording the mathematics, making explicit the mathematics to be focussed on in the session. Use sentence starters like "watch me while I…", "Do you remember how we….?", "Listen while I explain…" (Use in first day of the week to introduce new math concepts or to link in new concepts with those skills already learnt.
- **Shared Mathematics**- The teacher and the students work together through the learning process. The teacher prompts the students, questioning and supporting them as they reinforce, modify and extend their skills and understandings. The students ask questions and suggest strategies. Use prompts eg. "Today we are looking at…", "What do you know about…?", "Tell me about…"
- **Guided Mathematics**- The teacher plays a guiding role in a small focus group (as with guided reading) as they think, talk and work their way through a mathematical experience
- **Independent Mathematics**- Carefully planned activities or activity that the students move on to one the whole class focus session has been completed. This could include small rotating group, focussing on the needs/abilities of different groups of students relating to the topic explored, or one whole open-ended task related to the topic which takes into account the different needs within the group.
- **Math Learning Experiences**- real life simulations that bring into practice the skills focused on for the week (eg. baking a cake for a focus on measurement, with children measuring out ingredients)
- Engage students in exploring differences and similarities in size and order (to one thousandth)

- Teach integers (positive and negative numbers)
- Teach students how to use factors for strategies for multiplication
- Engage students in tasks to use mental and written algorithms for the 4 operations
- Engage students in identifying and using arithmetic relationships within number sentences to solve problems
- Teach estimation for computation
- *Contextual Clues* – hands-on and visual support makes the language of math more comprehensible. For example, a lesson about fractions using manipulatives is more understandable, rather than explaining the concept.
- *Verbal Interaction* – providing students with opportunities to work together to solve problems. They need to give and receive information, along with completing authentic tasks working together using English.
- *Active Participation* – requiring active involvement in math activities motivates students, engages them in the learning process, and helps them remember content easier.
- Provide explicit instructions and practice with reading and writing word problems. Teach students to identify key words for solving word problems and identifying mathematical operations.
- Review mathematical vocabulary and concepts using math games, examples include Tic-Tac-Toe, bingo, and concentration.
- Integrate educational technology tools, i.e., Mathletics, interactive math websites, and interactive computer games.
- Integrate hands-on activities by using manipulatives, real life materials, and calculators.
- Respond to questions, i.e., think/pair/share, flashcards to raise over head, hand and/or body movements, individual chalkboards for solving computations.
- Integrate reading and writing about math through the use of learning journals, learning logs, and literature.
- Use graphic organizers to visually represent mathematical concepts.
- Use visuals whenever possible to reinforce auditory instruction, i.e., charts, graphs, manipulatives, diagrams, models, real objects.
- Design multi-sensory lessons that address various student learning styles, i.e., visual, auditory, tactile, and kinesthetic.
- Use math cloze exercises or sentence prompts

- Model the problem solving process by talking aloud while solving problems on the overhead, chalkboard, or interactive white board to demonstrate thinking processes.
- Encourage students to use mathematics picture dictionary of terms and concepts or online maths dictionaries at www.coolmath.com
- Draw sketches, drawings, and models to see the problem.
- Make connections-Is the word problem similar to a previous work, if so how was it solved?
- Develop a plan based on the information determined to be important for solving the problem. Carry out the plan using the math operations which were determined would find the answer.
- Work the problem in reverse or backwards, starting with the answer to see if you wind up with your original problem.
- Games for tuning in
- Look for clues to determine which math operation is needed to solve the problem, for example addition, subtraction, etc. Look for key words like sum, difference, product, perimeter, area, etc. They lead to the operation needed to solve the problem.
- Look for what is needed solve the problem, for example: how many will are left, the total will be, everyone gets red, everyone gets one of each, etc.
- Effective teaching aids for math include chalk boards, coins, Legos and colored markers. Discover how to make math a more visual endeavor with help from a math teacher

- Manipulatives- Connecting concept acquisition using specially designed blocks, unifix, MAB, sticks, bundles, place value charts, fraction conversion charts
- Use mathematic language
- attend to students' preconceptions and begin instruction with what students think and know
- focus on what is to be taught, why it is taught and what mastery looks like
- encourage a culture of questioning and risk-taking within learning.
- Develop student learning goals in mathematics which are reviewed by the students at the end of each term
- Build mathematics vocabulary
- Creating opportunities for verbal interaction about the mathematics
- Discussions: Pair-Share, small group, whole class
- Modified teacher speech - Paraphrasing, repeat idea with correct vocabulary, adjust rate of speech, enunciate clearly (hundreds vs. hundredths)
- Leveled Questions-Adjusting questioning strategies to the language and mathematics levels of students
- Real Strategies- Connecting concept acquisition using real world objects

	GRADE 5- Expected Standards for the End of the Year	NY	Sometimes	Always
Statistics & Probability	Places probabilities in the range 0 to 1, by estimating proximity to known benchmarks (eg. 0 for impossible; 1 for certain; a 50:50 chance)			
	Explains why the chance of choosing a boy/girl from one class is higher than the chance of choosing a boy/girl from another class using clear conclusions (eg. one class has a higher number of boys etc)			
	Writes a questionnaire to collect categorical and simple discrete numerical data			
	Displays and interprets categorical and simple discrete numerical data			
	Organises data by grouping and sorting to better interpret the data			
	Has started to quantify likelihoods as fractions and percentages (3/5 chance, 80% chance)			
	Solves problems involving the collection of data over time, carrying out the investigation and reporting the results (including the use of ICT), and justifies conclusions about the relationship between variables			
	Is beginning to compare and contrast multiple sorts of data about the same topic (bivariate data)			
	Can create tables to record data related to a variable change over time and plans and uses efficient methods to collect data			
	Designs simple written surveys			
	Create a class table in which individuals record their data (in tallies)			
	Can locate appropriate data sets on the internet			
	Presents the results of investigations to best illustrate how the data answers the question being investigated and justifies the choice of representation			
	Interprets graph representations of the results of investigations and draws conclusions about the question posed			
	Identifies the mode and median in lists and on dot plots			
	Understands that dot plots represent ordered lists of data and hence the median can be found by counting along the plot to find the middle of the data if there is an odd number of data used or the halfway point between the two middle data points for an even set			
	Discusses in everyday terms the effect of skewing and outliers on the median			
	Uses and compares the effectiveness of a range of data representations including for specific situations			
	Uses data in representations to aid in making decisions, such as using tables to compare the cost of mobile phone plans			
	Quantifies chance with fractions, and applies this to investigate complementary events			
	Expresses the likelihood of all possible outcomes			
	Investigates games of chance and quantifies the chance of winning and hence of losing			

GRADE 5 EXPLICIT TEACHING STRATEGIES- Statistics and Probability

- Daily 1.0hour numeracy block including a whole-small-whole organisation with a ratio of 15 minute explicit introduction to the lesson as a whole class, breaking into an independent activity or rotational open-ended activities (with the teacher working explicitly with a small group targeting the needs of students and moving them forward in their learning, scaffolding the development of necessary skills) and then back to the whole group for 15 minutes to recap and share experiences and learning.
- Teach students to recognise and distinguish between different types of data (Discrete and continuous)
- Give students strategies in order to represent data in appropriate graphs and tables
- Engage students in tasks to recognise and investigate the usefulness of data and chance
- *Contextual Clues* – hands-on and visual support makes the language of math more comprehensible. For example, a lesson about fractions using manipulatives is more understandable, rather than explaining the concept.
- *Verbal Interaction* – providing students with opportunities to work together to solve problems. They need to give and receive information, along with completing authentic tasks working together using English.
- *Active Participation* – requiring active involvement in math activities motivates students, engages them in the learning process, and helps them remember content easier.
- Integrate educational technology tools, i.e., Mathletics, interactive math websites, and interactive computer games.
- Use chance games with dice, spinners, coins or bingo-type drawing
- Use graphic organizers to visually represent mathematical concepts.
- Respond to questions, i.e., think/pair/share, flashcards to raise over head, hand and/or body movements, individual chalkboards for solving computations.
- Integrate reading and writing about math through the use of learning journals, learning logs, and literature.

- Use visuals whenever possible to reinforce auditory instruction, i.e., charts, graphs, manipulatives, diagrams, models, real objects.
- Design multi-sensory lessons that address various student learning styles, i.e., visual, auditory, tactile, and kinesthetic.
- Model the problem solving process by talking aloud while solving problems on the overhead, chalkboard, or interactive white board to demonstrate thinking processes.
- Encourage students to use mathematics picture dictionary of terms and concepts or online maths dictionaries at www.coolmath.com
- Hands on math tasks
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- Discussions: Pair-Share, small group, whole class
- Modified teacher speech - Paraphrasing, repeat idea with correct vocabulary, adjust rate of speech, enunciate clearly (hundreds vs. hundredths)
- Leveled Questions-Adjusting questioning strategies to the language and mathematics levels of students
- Real Strategies- Connecting concept acquisition using real world objects

	GRADE 5- Expected Standards for the End of the Year	NY	Sometimes	Always
Measurement & Geometry	Measures mass and capacity, choosing suitable instruments and appropriate metric units (eg. g, kg, mL, L)			
	Calculates areas of rectangles by multiplying length by width			
	Measures as accurately as needed for the purpose (eg. a 4 litre tin of paint is sufficient to paint this room)			
	Knows the relationship between metric units, including cm/m/km and sec/min/hr/day/month/year			
	Has developed a range of personal benchmarks to estimate mass (eg. 50g chocolate bar)			
	Has developed a range of personal benchmarks to estimate capacity (eg. 375ml can)			
	Has developed a range of personal benchmarks to estimate length (eg. 30cm ruler)			
	Measures angles in degrees with a protractor			
	Explores different ways of calculating perimeter and area of rectangles and volume of rectangular prisms using metric units			
	Understands the meaning of perimeter, area and volume			
	Uses square metres, square centimetres to measure the areas of a range of shapes including squares, rectangles, triangles			
	Makes generalisations about the relationship between length, width and area			
	Investigates the relationship between perimeter and area			
	Visualises, demonstrates and describes the effect of translations, reflections, and rotations of 2D shapes			
	Describes line and simple rotational symmetry including the use of ICT			
	Describes locations and routes using a coordinate system such as road maps, the four main compass directions and the language of direction and distance			
	Gives and follows and compares directions from different sources including using street maps, GPS systems and websites			
	Describes locations and routes that involve turns at intersections, to understand how coordinate systems are used and how they benefit navigation			
	Solves realistic problems involving 12 and 24 hour time			
	Understands that time can be expressed in different ways			
	Makes connections between 12 hour am and pm times and 24 hour times such as linking the key times in both systems (12:00 am and 0000, 2:30am and 0230)			
	Uses 12 and 24 hour time to solve problems concerning time duration such as planning a holiday			
	Reads and interprets scales using whole numbers of metric units for length, capacity, mass and temperature			
	Uses mathematical language, including perpendicular, parallel and curved, when making or describing shapes and solids			
	Identifies angles statically (eg. in a triangle)			
	Identifies angles dynamically (eg. measuring the amount of a turn)			
	Draws distant smaller objects (perspective)			

	Constructs 3D objects from visual information/descriptors			
	Describes changes to pictures in terms of transformations (eg. that house has been turned 90 degrees)			
	Makes connections between different types of triangles and quadrilaterals using their features, including symmetry and explain reasoning			
	Understands that geometric features can be used to classify shapes and objects			
	Notes similarities and differences amongst each category			
	Classifies shapes according to lengths of sides, corners, vertices, faces			

GRADE 5 EXPLICIT TEACHING STRATEGIES-
Measurement and Geometry

- Daily 1.0hour numeracy block including a whole-small-whole organisation with a ratio of 15 minute explicit introduction to the lesson as a whole class, breaking into an independent activity or rotational open-ended activities (with the teacher working explicitly with a small group targeting the needs of students and moving them forward in their learning, scaffolding the development of necessary skills) and then back to the whole group for 15 minutes to recap and share experiences and learning.
- Engage students in tasks to classify shapes and solids using the properties of lines, angles, sufaces, vertices, faces, and edges
- Teach the use of scale to enlarge and reduce shapes and to estimate and measure time, capacity, angles, perimeter and area
- Teach skills in conversion between metric units
- Engage students in exploring relative location using size, scale and direction
- *Contextual Clues* – hands-on and visual support makes the language of math more comprehensible. For example, a lesson about fractions using manipulatives is more understandable, rather than explaining the concept.
- *Verbal Interaction* – providing students with opportunities to work together to solve problems. They need to give and receive information, along with completing authentic tasks working together using English.
- *Active Participation* – requiring active involvement in math activities motivates students, engages them in the learning process, and helps them remember content easier.
- Review mathematical vocabulary and concepts using math games, examples include Tic-Tac-Toe, bingo, and concentration.
- Integrate educational technology tools, i.e., Mathletics, interactive math websites, and interactive computer games.
- Integrate hands-on activities by using manipulatives, real life materials, and calculators.
- Respond to questions, i.e., think/pair/share, flashcards to raise over head, hand and/or body movements, individual chalkboards for solving computations.
- Integrate reading and writing about math through the use of learning journals, learning logs, and literature.
- Use graphic organizers to visually represent mathematical concepts.
- Use visuals whenever possible to reinforce auditory instruction, i.e., charts, graphs, manipulatives, diagrams, models, real objects.
- Design multi-sensory lessons that address various student learning styles, i.e., visual, auditory, tactile, and kinesthetic.
- Model the problem solving process by talking aloud while solving problems on the overhead, chalkboard, or interactive white board to demonstrate thinking processes.
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- Develop student learning goals in mathematics which are reviewed by the students at the end of each term

- Build mathematics vocabulary
- Creating opportunities for verbal interaction about the mathematics
- Discussions: Pair-Share, small group, whole class
- Modified teacher speech - Paraphrasing, repeat idea with correct vocabulary, adjust rate of speech, enunciate clearly (hundreds vs. hundredths)

- Leveled Questions-Adjusting questioning strategies to the language and mathematics levels of students
- Real Strategies- Connecting concept acquisition using real world objects

GRADE SIX

	GRADE 6- Expected Standards for the End of the Year	NY	Sometimes	Always
N u m b e r & A l g e b r a	Reads, represents, writes, interprets and orders positive and negative integers to 1,000,000 and beyond			
	Understands that whole numbers can be positive and negative and continue indefinitely in both directions			
	Investigates everyday situations which use positive and negative integers such as global temperatures, to understand how the positive numbers (whole numbers, fractions, decimals and percentages) can be extended to include negative numbers			
	Uses number lines to position and order positive and negative integers around zero			
	Understands place value from 1/1000 to 1,000,000			
	Solves everyday additive problems involving positive and negative integers without developing formal rules for the operations (eg using a number line and counting to find the resulting outside temperature if it is 5°C at 7:00 pm and drops by 8°C overnight)			
	Recognises and represents numbers involving thousandths, reads, writes and orders those numbers, and connects them to fractions			
	Has an understanding of place value to three decimal places			
	Connects decimals and fractional representations of numbers to thousandths (eg understanding that 12 thousandths, 0.012, and 12⁄1000 are equivalent)			
	Reads and writes any number involving up to three decimal places (eg. 3.147 is 'three point one, four, seven')			
	Uses place value understanding to compare and order numbers to thousandths			
	Understands that the length of the number does not denote its relative size (eg 3.701 is not larger than 3.72)			
	Justifies use of place value in calculations and problems involving numbers to thousandths			
	Extends the place value pattern of grouping in tens from whole numbers and numbers to hundredths, to thousandths (eg by using equipment, such as place value blocks)			
	Describes the composition of numbers with up to three decimal places in a variety of ways, such as 1 = 10 tenths or 100 hundredths and using this understanding to solve problems, such as 0.5 + 0.902 by recognising that 5 tenths and 9 tenths are 14 tenths or 1 whole and 4 tenths and hence the result is 1.402			
	Can apply multiplication and related division facts to solve realistic problems efficiently using mental and written strategies and calculators to 1,000,000			
	Understands that there are a number of different strategies that can be used to solve problems and that the problem affects which strategies are more efficient (mental, written and calculator methods)			
	Interprets and represents the remainder in division calculations sensibly for the context (eg. 27.4 in calculating average height in cm; $27.44 if it represents an amount of money)			
	Recognises and solves problems involving unit ratio and everyday rates			
	Understands some relationships are represented by ratios or rates which specify a multiplicative relationship between two quantities			
	Understands that rates are particular ratios between quantities measured in different units, such as speed is the ratio distance : time and pricing rate is cost			

Solves problems involving familiar rates by using tables, ordered lists and multiplication/division (eg. calculating the time taken to read a 280-page book if I can read 20 pages in an hour)			
Calculates a unit ratio and using this to compare, such as calculating the unit price of goods			
Extends whole number strategies to explore and develop meaningful written strategies for addition and subtraction of decimal numbers to thousandths, and to represent and record calculations involving multiplication and division of decimals			
Understands and uses equivalent division calculations which result if both numbers are multiplied or divided by the same amount (eg 34.87 ÷ 7 is equivalent to 3 487 ÷ 700)			
Uses and explains the use of multiplication and division by powers of 10 to mentally multiply decimal numbers			
Understands and works fluently with and solves additive problems involving fractions with unrelated denominators (compares and contrast fractions using equivalence)			
Comparing and ordering fractions by identifying equivalent representations with like denominators			
Explores and develops efficient written strategies to solve additive problems involving fractions			
Identifies the operations required to solve realistic problems involving fractions			
Understands and works fluently with decimal numbers to thousandths, and multiplies and divides numbers including decimals by whole numbers to solve additive problems, including using technology			
Estimates the outcomes of calculations involving decimal numbers and justify the reasonableness of answers			
Understands that the strategies used to estimate the outcomes of calculations involving whole numbers apply equally to decimals			
Estimates answers mentally and using the estimates to check answers obtained			
Rounds decimal numbers to the nearest integer to estimate answers and judge the reasonableness of the results obtained (eg. recognising that 5.3 × 0.88 is approximately 5 × 1 and so the result will be close to 5)			
Understands that when both numbers in a calculation are rounded in the same direction the result will be an over or underestimate of the answer (eg approximating 22.3 × 1.2 with 20 × 1 will result in an estimate that is less than the actual result)			
Identifies and describes the properties of numbers including prime, composite and square numbers			
Writing composite numbers as a product of their prime factors and using this form to simplify calculations by cancelling common primes			
Understanding that if a number is divisible by a composite number then it is also divisible by the prime factors of that number (eg 216 is divisible by 8 because the number represented by the tens and ones is divisible by 8, and hence 216 is also divisible by 2 and 4)			
Investigates properties of special numbers, such as square numbers, triangular numbers and patterns in Pascal's triangle			
Recognises and calculates simple powers of whole numbers (eg. $2^4=16$)			
Explains and uses mental and written algorithms for addition, subtraction, multiplication and division of natural numbers			
Understands and applies the order of operations			

GRADE 6 EXPLICIT TEACHING STRATEGIES-
Number and Algebra

- **Daily 1.0hour numeracy block** including a whole-small-whole organisation with a ratio of 15 minute explicit introduction to the lesson as a **whole class (focusing and promoting/articulating the math vocab needed)**, breaking into an **independent activity** or rotational open-ended activities (with the teacher working explicitly with a **small group targeting the needs of students** and moving them forward in their learning, scaffolding the development of necessary skills) and then back to the whole group for 15 minutes to recap and **share experiences** and learning.
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- **Shared Mathematics**- The teacher and the students work together through the learning process. The teacher prompts the students, questioning and supporting them as they reinforce, modify and extend their skills and understandings. The students ask questions and suggest strategies. Use prompts eg. "Today we are looking at…", "What do you know about…?", "Tell me about…"
- **Guided Mathematics**- The teacher plays a guiding role in a small focus group (as with guided reading) as they think, talk and work their way through a mathematical experience
- **Independent Mathematics**- Carefully planned activities or activity that the students move on to one the whole class focus session has been completed. This could include small rotating group, focussing on the needs/abilities of different groups of students relating to the topic explored, or one whole open-ended task related to the topic which takes into account the different needs within the group.
- **Math Learning Experiences**- real life simulations that bring into practice the skills focused on for the week (eg. baking a cake for a focus on measurement, with children measuring out ingredients)
- Engage students in exploring differences and similarities in size and order (to one thousandth)

- Teach integers (positive and negative numbers)
- Teach students how to use factors for strategies for multiplication
- Engage students in tasks to use mental and written algorithms for the 4 operations
- Engage students in identifying and using arithmetic relationships within number sentences to solve problems
- Teach estimation for computation
- *Contextual Clues* – hands-on and visual support makes the language of math more comprehensible. For example, a lesson about fractions using manipulatives is more understandable, rather than explaining the concept.
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- Games for tuning in
- Look for clues to determine which math operation is needed to solve the problem, for example addition, subtraction, etc. Look for key words like sum, difference, product, perimeter, area, etc. They lead to the operation needed to solve the problem.
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- Leveled Questions-Adjusting questioning strategies to the language and mathematics levels of students
- Real Strategies- Connecting concept acquisition using real world objects

	GRADE 6 - Expected Standards for the End of the Year	NY	Sometimes	Always
S t a t i s t i c s & P r o b a b i l i t y	Construct, read and interpret tables and graphs including ordered stem and leaf plots, and construct pie charts and other simple data displays including using technology			
	Can extract and interpret numerical information contained in tables, graphs and data displays			
	Calculates and interprets measures of centrality (mean, median, mode) and data spread (range)			
	Calculates probabilities for chance outcomes (eg. Using spinners) and uses the symmetry properties of equally likely outcomes			
	Simulates chance events (eg. the chance that a family has three girls in a row)			
	Understands that experimental estimates of probabilities become theoretical probability in the long run			
	Recognises and gives consideration to different data types in forming questionnaires and sampling			
	Distinguishes between categorical and numerical data			
	Classifies numerical data as discrete (from counting) or continuous (from measurement)			
	Presents data in appropriate displays (eg. a pie chart for eye colour data and a histogram for grouped data of student heights)			
	Understands that some data representations are more appropriate than others for particular data sets			
	Understands that the stems of a stem and leaf plot groups numerical data and uses this type of data system to collect data for a class investigation			
	Uses technology to create pie charts, bar graphs, line graphs, tables and charts			
	Interprets secondary data presented in the media and elsewhere, identifying misleading representations and distinguishing between samples and populations. Investigating and discussing what they show and the messages that the people who created the representations might want to convey			
	Understands the importance of factors affecting data collection and display including: who created the representation; who funded the collection of the data; and whether or not the representation is part of an advertisement			
	Explores concepts of variation and error by collecting repeated measurements			
	Understands that variation is inherent in measurement and that there are limits to the possible precision of measurement to appreciate the need for, and basis of, statistics and probabilistic reasoning			
	Lists all outcomes for chance events and quantify probabilities using simple fractions, decimals and percentages			
	Understands that it is necessary to identify all possible outcomes (the sample space) before probabilities can be calculated			
	Explores and develops increasingly systematic procedures to list all of the possible outcomes of chance events (eg using organised lists, tree diagrams or two way tables to identify all of the possible totals obtained from rolling two dice)			
	Calculates the probability of winning a game of chance and commenting on the likelihood of losing or winning the game			

GRADE 6 EXPLICIT TEACHING STRATEGIES- Statistics and Probability

- Daily 1.0hour numeracy block including a whole-small-whole organisation with a ratio of 15 minute explicit introduction to the lesson as a whole class, breaking into an independent activity or rotational open-ended activities (with the teacher working explicitly with a small group targeting the needs of students and moving them forward in their learning, scaffolding the development of necessary skills) and then back to the whole group for 15 minutes to recap and share experiences and learning.
- Teach students to recognise and distinguish between different types of data (Discrete and continuous)
- Give students strategies in order to represent data in appropriate graphs and tables
- Engage students in tasks to recognise and investigate the usefulness of data and chance
- *Contextual Clues* – hands-on and visual support makes the language of math more comprehensible. For example, a lesson about fractions using manipulatives is more understandable, rather than explaining the concept.
- *Verbal Interaction* – providing students with opportunities to work together to solve problems. They need to give and receive information, along with completing authentic tasks working together using English.
- *Active Participation* – requiring active involvement in math activities motivates students, engages them in the learning process, and helps them remember content easier.
- Integrate educational technology tools, i.e., Mathletics, interactive math websites, and interactive computer games.
- Use chance games with dice, spinners, coins or bingo-type drawing
- Use graphic organizers to visually represent mathematical concepts.
- Respond to questions, i.e., think/pair/share, flashcards to raise over head, hand and/or body movements, individual chalkboards for solving computations.

- Integrate reading and writing about math through the use of learning journals, learning logs, and literature.
- Use visuals whenever possible to reinforce auditory instruction, i.e., charts, graphs, manipulatives, diagrams, models, real objects.
- Design multi-sensory lessons that address various student learning styles, i.e., visual, auditory, tactile, and kinesthetic.
- Model the problem solving process by talking aloud while solving problems on the overhead, chalkboard, or interactive white board to demonstrate thinking processes.
- Encourage students to use mathematics picture dictionary of terms and concepts or online maths dictionaries at www.coolmath.com
- Hands on math tasks
- Effective teaching aids for math include chalk boards, coins, Legos and colored markers. Discover how to make math a more visual endeavor with help from a math teacher
- Manipulatives- Connecting concept acquisition using specially designed blocks, unifix, MAB, sticks, bundles, place value charts, fraction conversion charts
- Use mathematic language
- attend to students' preconceptions and begin instruction with what students think and know
- focus on what is to be taught, why it is taught and what mastery looks like
- encourage a culture of questioning and risk-taking within learning.
- Develop student learning goals in mathematics which are reviewed by the students at the end of each term
- Build mathematics vocabulary
- Creating opportunities for verbal interaction about the mathematics
- Discussions: Pair-Share, small group, whole class
- Modified teacher speech - Paraphrasing, repeat idea with correct vocabulary, adjust rate of speech, enunciate clearly (hundreds vs. hundredths)
- Leveled Questions-Adjusting questioning strategies to the language and mathematics levels of students

	GRADE 6- Expected Standards for the End of the Year	NY	Sometimes	Always
M e a s u r m e n t & G e o m e t r y	Visualise different views of three dimensional objects assists in the solution of realistic problems including those relating to packaging			
	Solves problems relating to packing and stacking such as making efficient cartons of cans			
	Solves problems involving comparison of length, area, volume and other attributes using appropriate tools, scales and metric units			
	Solves problems involving comparisons of length and area and lengths and volumes			
	Understands and uses the formulas for calculating perimeters and areas of rectangles, and volumes of rectangular prisms			
	Understands that there are efficient ways of calculating perimeter, area and volume			
	Classifies and sorts shapes and solids (e.g. prisms, pyramids, cylinders and cones) using properties of lines (orientation and size), angles, (less than, equal to, are greater than 90°), and surfaces			
	Develops and follows instructions to draw shapes and nets of solids using simple scale.			
	Chooses the appropriate tools and units to use in solving problems dependent on the level of accuracy required and the context of the problem			
	Works fluently with the metric system to convert between metric units of length, capacity and mass, using whole numbers and commonly used decimals			
	Understands the decimal nature of the metric system and connecting place value understanding to the conversion of units			
	Converts between metric units of length, capacity and mass such as recognising and using the most suitable equivalent representations involving whole units and halves, quarters and tenths			
	Estimates, compares and measures angles			
	Builds on own understanding of turn and rotation in the contexts of mapping and rotational symmetry, to measure, estimate and compare angles in degrees and classify angles according to their sizes			
	Estimates, measures and compares angles, such as using knowledge of the magnitude of angles including 30°, 45°, 90°, 180° and 270° to make reasonable estimates of angles			
	Identifies that angles have arms and a vertex, and the size is the amount of turn required for one arm to coincide with the other			
	Identifies that the size of a right angle is 90° and defines acute, obtuse and reflex angles and a rotation by relating them to right angles			
	Creates, interprets and uses timetables and timelines (using appropriate scales) including calculating elapsed time			
	Interprets and uses timetables, taking account of the format in which the times are expressed, such as accessing various airline timetables (also takes into account time zones when planning journeys)			
	Describes patterns in terms of reflection and rotational symmetry, and translations including identifying equivalent transformations using ICT			

	Understands transformations to help with identifying movement of shapes and in identifying rotational and line symmetry			
	Describes the features of shapes and solids that remain the same (e.g. angles) or change (e.g. surface area) when a shapes is enlarged or reduced.			
	Applies a range of transformations to shapes and create tessellations using tools (e.g. computer software).			
	Uses the ideas of size, scale, and direction to describe relation location and objects in maps.			
	Uses compass directions, coordinates, scale and distance, and conventional symbols to describe routes between places shown on maps.			
	Uses network diagrams to show relationships and connectedness (e.g. a family tree or shortest path between towns on a map)			
	Describes the features of shapes and solids that remain the same (e.g. angles) or change (e.g. surface area) when a shapes is enlarged or reduced.			
	Applies a range of transformations to shapes and create tessellations using tools (e.g. computer software).			
	Uses the ideas of size, scale, and direction to describe relation location and objects in maps.			
	Creates and interprets a variety of everyday map types, such as those in sight-seeing brochures, topographical maps for bushwalking, road maps for touring Australia, and maps highlighting changes over time in places like the Great Barrier Reef, and describing their features which might include scales, legends, compass points and grids			
	Interprets maps to pinpoint locations by grid reference, to plan routes (using the scale to estimate distance), or to orienteer around a course with a compass and a sequence of directions (eg make a 90° clockwise turn and travel in a SSE direction for 100 m)			
	Describes and interprets locations, such as using a grid reference to indicate the exact position of an object, or using scales to estimate whether the distance between two points can be reached by a given time by a group which is on foot, or using compass directions and distances to plan a route			
	Applies understanding of features of maps and compass points to further pinpoint locations			
	Has understanding of the reflection and rotation of figures, and reflection and rotational symmetry, to identify combinations of transformations that produce the same result			
	Uses grid paper and ICT to establish equivalent transformations			
	Describes and interprets locations and gives and follows directions, using scales, legends, compass points, including directions such as NE and SW, distances, and grid references			
	Converts between metric unites of length, capacity and time (e.g. L-mL, sec-min).			
	Describes and calculates probabilities using words, and fractions and decimals between 0 and 1.			

GRADE 6 EXPLICIT TEACHING STRATEGIES-
Measurement and Geometry

- Daily 1.0hour numeracy block including a whole-small-whole organisation with a ratio of 15 minute explicit introduction to the lesson as a whole class, breaking into an independent activity or rotational open-ended activities (with the teacher working explicitly with a small group targeting the needs of students and moving them forward in their learning, scaffolding the development of necessary skills) and then back to the whole group for 15 minutes to recap and share experiences and learning.
- Engage students in tasks to classify shapes and solids using the properties of lines, angles, sufaces, vertices, faces, and edges
- Teach the use of scale to enlarge and reduce shapes and to estimate and measure time, capacity, angles, perimeter and area
- Teach skills in conversion between metric units
- Engage students in exploring relative location using size, scale and direction
- *Contextual Clues* – hands-on and visual support makes the language of math more comprehensible. For example, a lesson about fractions using manipulatives is more understandable, rather than explaining the concept.
- *Verbal Interaction* – providing students with opportunities to work together to solve problems. They need to give and receive information, along with completing authentic tasks working together using English.
- *Active Participation* – requiring active involvement in math activities motivates students, engages them in the learning process, and helps them remember content easier.
- Review mathematical vocabulary and concepts using math games, examples include Tic-Tac-Toe, bingo, and concentration.
- Integrate educational technology tools, i.e., Mathletics, interactive math websites, and interactive computer games.
- Integrate hands-on activities by using manipulatives, real life materials, and calculators.
- Respond to questions, i.e., think/pair/share, flashcards to raise over head, hand and/or body movements, individual chalkboards for solving computations.
- Integrate reading and writing about math through the use of learning journals, learning logs, and literature.

- Use graphic organizers to visually represent mathematical concepts.
- Use visuals whenever possible to reinforce auditory instruction, i.e., charts, graphs, manipulatives, diagrams, models, real objects.
- Design multi-sensory lessons that address various student learning styles, i.e., visual, auditory, tactile, and kinesthetic.
- Model the problem solving process by talking aloud while solving problems on the overhead, chalkboard, or interactive white board to demonstrate thinking processes.
- Encourage students to use mathematics picture dictionary of terms and concepts or online maths dictionaries at www.coolmath.com
- Hands on math tasks
- Effective teaching aids for math include chalk boards, coins, Legos and colored markers. Discover how to make math a more visual endeavor with help from a math teacher
- Manipulatives- Connecting concept acquisition using specially designed blocks, unifix, MAB, sticks, bundles, place value charts, fraction conversion charts
- Use mathematic language
- attend to students' preconceptions and begin instruction with what students think and know
- focus on what is to be taught, why it is taught and what mastery looks like
- encourage a culture of questioning and risk-taking within learning.
- Develop student learning goals in mathematics which are reviewed by the students at the end of each term
- Build mathematics vocabulary
- Creating opportunities for verbal interaction about the mathematics
- Discussions: Pair-Share, small group, whole class
- Modified teacher speech - Paraphrasing, repeat idea with correct vocabulary, adjust rate of speech, enunciate clearly (hundreds vs. hundredths)
- Leveled Questions-Adjusting questioning strategies to the language and mathematics levels of students
- Real Strategies- Connecting concept acquisition using real world objects

REFERENCE LIST

- We would like to acknowledge the work undertaken by Lyndale Green Primary School in the development of this document. We have modified sections to suit our small rural school

- National Curriculum Document (AusVels)

- Victorian Essential Learning Standards Progression Point Document

- National Literacy and Numeracy Document (DEECD)

- Key Characteristics of Effective Numeracy Teaching P-6 (DEECD)