2021

Recommended Remediation Strategies for developing Core Content and Skills in Secondary Mathematics:

FORM ONE – FORM THREE

CURRICULUM PLANNING AND DEVELOPMENT DIVISION

NOVEMBER 2021

Contents

INTRODUCTION

The **Recommended Remediation Strategies for developing Core Content and Skills in Secondary Mathematics: FORM ONE – FORM THREE** document has been produced to provide support for teachers to support concepts and skills' development in students, in order to mitigate learning loss due to the COVID 19 Pandemic.

Diagnostic tests were constructed and administered to students in classes from Form One to Form Three in Government and Government Assisted Secondary Schools. The tests were based on the content strands: Number; Number Operations and Number Theory; Algebra; Sets, Relations and Functions; Measurement; Geometry; and Statistics as identified in the Curriculum Guide for Mathematics at the Lower Secondary Level.

A response to the findings from these tests is a set of recommended strategies for remediation classified into three levels based on the number of correct items, per strand. The strand specific classification of bands of performance by levels is included in this document in Appendix 1. Three levels of students' performances were addressed in each strand: Level I, Level 2, and Level 3.

Level 1 recommendations address very little or no understanding of content in the respective strands, Level 2 recommendations address minimum to average understanding of content in the respective strands, and Level 3 recommendations address above average understanding of content in the respective strands.

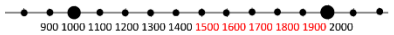
Recommendations are presented in this document according to class levels. They are suggestions for teachers' use to remedy students' understanding, **based-on analysis of students' scores per strand according to the different levels of performance**. The recommendations are structured to sequentially develop the students' understanding of concepts and skills in each strand. Teachers are therefore asked to **use the strategies in sequence**.

Strategies for parents and guardians are grouped for the class levels from Forms 1 - 3, in the document. Teachers are kindly asked to share and discuss with the parents and guardians, all the strategies they can use to complement and reinforce classroom instruction, to support the students' development of concepts and skills while at home in their natural environment.

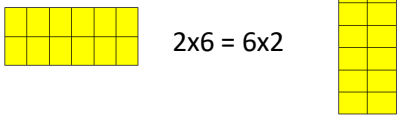
Developed by
The Mathematics Unit
Curriculum Planning and Development Division
Ministry of Education, GORTT
(November 2021)

FORM 1

<table>
<tr><th colspan="4">NUMBER</th></tr>
<tr><th rowspan="2">CONTENT/SKILL</th><th colspan="3">REMEDIATION STRATEGIES</th></tr>
<tr><th>LEVEL 1</th><th>LEVEL 2</th><th>LEVEL 3</th></tr>
<tr><td>Represent whole numbers to 1 000 000 using multiple models and connect to numerals and number names.</td><td>• Use base 10 manipulatives to familiarize students with place value.
• Use a place value chart to introduce place value
<table><tr><td>Thousands</td><td>Hundreds</td><td>Tens</td><td>Ones</td></tr><tr><td></td><td></td><td></td><td></td></tr></table></td><td><table><tr><td>Thousands</td><td>Hundreds</td><td>Tens</td><td>Ones</td></tr><tr><td></td><td></td><td></td><td></td></tr></table>• Encourage student to explore what happens if the digit in any cell exceeds 9
• Model place value of underlined digits.</td><td>• Allow students to work independently to find the value of a digit in a number</td></tr>
<tr><td>State the place value of any digit in large numbers.</td><td>• Use the place value table to assist students to recognize the place value of a digit before guiding the students to getting the value of the digit.
• Have students create games/jingles to remember the difference between place value and value.</td><td>• Provide opportunities for students to state the place value of an underlined digit.</td><td>• Allow students to practice place value independently and peer-review answers.
• Provide self-assessing worksheets for independent practice.</td></tr>
</table>

NUMBER			
CONTENT/SKILL	**REMEDIATION STRATEGIES**		
	LEVEL 1	**LEVEL 2**	**LEVEL 3**
Solve problems in addition and subtraction	• Use simple scenarios to elicit from the students, the operation (addition or subtraction) needed.	• Provide opportunities for students translate number problems into number sentences. • Allow students to solve number sentences.	• Encourage students to create problems based on a number sentence. • Allow students to work independently using worksheets.
Demonstrate an understanding of different types of numbers.	• Demonstrate the use of rectangular arrays to find factors. • Allow students to create arrays with different number of items. • Engage students in a skip count activity to find multiples. • Simple repeating pattern, - insert missing elements at the end, in the middle and at the start.	• Demonstrate the representation of composite numbers as a product of their prime factors concretely, pictorially and symbolically. • Encourage students to derive the definition of a prime number by comparing the factors of different numbers. • Introduce the types of patterns - increasing - decreasing - repeating • Allow students to describe these patterns.	• Engage students in an investigation of - square numbers - triangular numbers - cubic numbers • Allow students to work on more complex patterns: - square number patterns. - cube number patterns. • Create opportunities for students to derive the pattern rule for sequences. • Guide students use of a pattern rule to develop a sequence.
Round whole numbers to the nearest thousand.	• Use hopping game to round using 2-digit numbers • Guide students to apply similar principles to round 3-digit numbers to the nearest hundred.	• Allow students to locate a number on a number line then round to the nearest 1 000 	• Guide students to round to the nearest tens of thousands, hundreds of thousands and nearest million (without number lines).

NUMBER			
CONTENT/SKILL	**REMEDIATION STRATEGIES**		
	LEVEL 1	**LEVEL 2**	**LEVEL 3**
	• Illustrate how rounding can be used to estimate	• Have the students remove the number line and round numbers to the nearest 10, 100 and 1 000.	• Introduce rounding to the nearest dollar • Allow students to estimate quantities by rounding
Solve problems in addition (sum less than 10 000) and subtraction (minuend less than 10 000).	• Use simple scenarios to elicit from the students, the operation (addition or subtraction) needed	• Provide opportunities for students translate number problems into number sentences • Allow students to solve number sentences	• Encourage students to create problems based on a number sentence • Allow students to work independently using worksheets
Solve problems in multiplication and division	• Review multiplication tables and algorithms. • Provide students with scenario involving multiplication and division and allow the students to determine the operation to be used. • Use one-**step** problems. • Allow students to solve these problems.	• Provide opportunities for students to apply multiplication algorithms to solve problems • Demonstrate the technique for long division • Provide the students with practice exercises for long division	• Allow students to review the long division algorithm • Provide students with worksheets involving multi-step problems • Allow students to work and peer consult
Use a pattern rule to determine missing elements for a given pattern and to extend or predict	• Start with a simple repeating pattern. This may be easiest to recognize 0, 1, 2, 0, 1, 2, 0, 1, 2 …	• Guide students to recognize different types of sequences: - repeating - increasing - decreasing	• Introduce students to more complex patterns: - square number patterns. - cube number patterns.

NUMBER			
CONTENT/SKILL	**REMEDIATION STRATEGIES**		
	LEVEL 1	**LEVEL 2**	**LEVEL 3**
subsequent elements in patterns.	 • Have students insert missing terms: - at the end - in between - at the start	• Encourage students to do self-assessing exercises using worksheets	• Allow students to create the pattern rule for sequences • Ask students to use a pattern rule to develop a sequence
Factors and multiples of numbers	• Finding factors: • Give students 12 objects and have students create square or rectangular arrays. • The length and width will be the factors of 12.  1x12  2x6 = 6x2 • Use games to enable students to skip count to find multiples.	• Allow to find factors of two numbers simultaneously by creating arrays with the same width. • Encourage students to put the factors on a table	• Introduce the concept of common factors and highest common factor. • Allow students to apply the algorithm for finding factors and multiples (without arrays).
Add and subtract fractions involving same denominator and one	• Allow students to create fraction wall. • Encourage students to use their fraction wall to compare and order fractions.	• Engage students in paper folding activities to form equivalent fractions. •	Use the fraction wall to create a fraction number line. 

NUMBER			
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denominator a multiple of the other.	• Use the fraction wall to add/subtract fractions with like denominators.	• Model the use of equivalent fractions to add/subtract fractions where one denominator is a multiple of the other.	• Introduce addition and subtraction of fractions where the denominators are unlike. • Include concepts of LCM and HCF. • Use worksheets for independent practice.
Calculate the whole given part as a unit fraction	• Use the set model to demonstrate the division of several items. • Allow students to interact with the items to discover the whole if a part is given.	• Develop the algorithm for finding the whole when a unit fraction is given. • Allow students to explore the idea of finding the whole if any part is given,	• Have students develop the algorithm for finding the whole when any part (not necessarily a unit part) is given. • Allow students to explain the procedure in a written form.
Record money values using decimals	• Use actual coins to count money. • Engage the students to think about how to represent coins that exceed 100 in value. • Use bills to count money. • Use a combination bills and coins to allow students to represent the value.	• Encourage activities that involve getting change after purchasing an item: - use small bills - purchase a single item • Provide opportunities for multiple purchases with larger bills. • Encourage students to “spot the error” in different money representations.	• Use worksheets to reinforce the ideas of: - profit and loss. - unit cost. - best buy.
Multiply fractions by whole numbers.	• Use the set model. • Use a diagram to model the technique	• Encourage students to list the steps involved in dividing whole numbers by fractions.	• Allow students to engage in independent practice on worded

NUMBER			
CONTENT/SKILL	**REMEDIATION STRATEGIES**		
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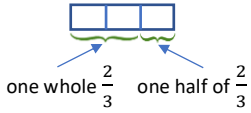
		• Develop an algorithm • Include the concept	problem worksheet (multiplying whole number by a fraction).
Divide fractions by whole numbers.	• Demonstrate the use a diagram to illustrate the technique of dividing a whole number by a fraction. E.g. $4 \div \frac{2}{3}$ Divide 1 whole into thirds  How many $\frac{2}{3}$ are in 1 whole?  1 whole represents $1\frac{1}{2}$ of $\frac{2}{3}$ 4 wholes represent $4 \times 1\frac{1}{2}$ of $\frac{2}{3}$ 4 wholes represent 6 times $\frac{2}{3}$ $4 \div \frac{2}{3} = 6$ • Encourage students to do independent practice using worksheets	• • Introduce the algorithm for dividing whole numbers by fractions. • Include the concept of reciprocal.	• Worded problems for dividing whole numbers by fractions. • Introduce students to the concept of rounding up and rounding down.

NUMBER			
CONTENT/SKILL	**REMEDIATION STRATEGIES**		
	LEVEL 1	**LEVEL 2**	**LEVEL 3**
Demonstrate an understanding of the relationships between fractions and percent	• Use a 100 part grid and allow students to shade different parts of this whole • Engage students in shading common fractions ($\frac{1}{2}, \frac{1}{4}, \frac{2}{5}$)	• Engage students in developing the algorithm for converting fractions to decimals • Allow students to discover what happens to the decimal point when multiplying/dividing decimals by 10 and multiples of 10.	• Allow students to engage in converting decimals to fractions – lowest terms and vice versa • Allow students to use the four operations on decimals
Convert linear measure from one form to the other (millimetres, centimetres and metres)	• Allow students to state the appropriate unit to measure everyday objects: paperclip, door, a beetle • Explain to students the multiplication and division by 10 and multiples of 10. • Have students create a conversion chart from millimetre to centimetre to metre	• Allow for independent practice using worksheets on conversions	• Encourage students to do questions involving the four operations on linear measure

MEASUREMENT			
CONTENT/SKILL	REMEDIATION STRATEGIES		
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Develop and use the formula to calculate the area of squares and rectangles	• Allow students to explore finding area/perimeter by counting squares • Explain the unit square • Encourage students to find area/perimeter of irregular shapes without fraction parts of the unit square	• Guide students to develop the formula for area – square, rectangle, triangle • Encourage students to verify by counting squares on a grid.	• Guide students to find the area of compound shapes given the dimensions • Use grid paper to allow students to discover the conservation of area/perimeter
Solve problems involving mass/weight	• Explore the reading different weighing scales • Model the conversion of grams to kilograms and vice versa • Allow students to practice the conversion • Encourage students to explore the meaning of a balanced scale mean	• Allow students to compare and order masses • Use the four operations to solve problems involving mass/weight	• Engage students in solving worded problems involving mass/weight (Include money)
Generalize a rule for determining the volume of cubes and cuboids	• Engage students in the building of cubes and cuboids with unifix cubes • Guide students to extract dimensions of the solid • By counting the number of stacked cubes, students are encouraged to find the volume of the cuboids	• Students engage in finding the volume of irregular solids by counting stacked cubes • Guide students towards finding the formula for volume of cubes and cuboids	• Use worksheets to engage students to do word problems involving volume • Engage students in building different solids with unifix cubes while keeping the volume constant

MEASUREMENT			
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Calculate the duration of events.	• Model the conversion of hours to minutes and vice versa. Include fractions of an hour • Allow students to practice the conversion • Allow students to add/subtract time from a given time	• Guide students to the method for finding elapsed time • Use simple subtraction first then increase the difficulty • Engage students in activities involving the calendar	• Allow independent study using worksheets with word problems involving time • Allow students to construct word problems for students to solve

GEOMETRY			
CONTENT/SKILL	**REMEDIATION STRATEGIES**		
	LEVEL 1	**LEVEL 2**	**LEVEL 3**
Identify angles on faces of solids or plane shapes that are right angles, greater than right angles or smaller than right angles.	• Allow students to explore parallel lines and perpendicular lines • Engage students in the construction of lines that converge at a point • Allow students to identify the angle formed by 2 lines • Allow students to investigate more than/Less than a right angle	• Teach students the difference between interior angles and exterior angles • Demonstrate the use of a protractor • Allow students to practice the use of a protractor • Guide students to distinguish among the types of angles	• Allow students to explore of angles in a triangle • Encourage students to build models of triangles. • Encourage the exploration of the interior angles of a polygon • Engage students in independent study using worksheets
Understand the properties of solids and plane shapes.	• Encourage students to explore types of solids • Engage students to mane the solid, count the number of faces, count the number of vertices • Use a plasticene log to engage students in a discussion of cross-section – uniform/non-uniform	• Engage students with drawing solids based on a description of their attributes • Allow students to identify solids based on a description of attributes	• Encourage students to draw the net of various solids after having dissected the solids

STATISTICS			
CONTENT/SKILL	**REMEDIATION STRATEGIES**		
	LEVEL 1	**LEVEL 2**	**LEVEL 3**
Interpret the findings displayed in the tables, charts and graphs	• Students collect data and begin organising • Encourage students to order the data. • Guide students to create a tally chart for the data. • Encourage students to build a frequency table for data. • Engage students to create a Bar Chart from the data. • Allow students to give reasons for answers and to explain decisions.	• Allow students to identify the median and mode • Guide students to develop the formula for mean • Allow students to research and present on the application of each of mean, mean and mode.	• Engage students in explaining what the mean represents. • Allow students to create visual representations of the mean. • Allow students to create and solve word problems involving mean, median and mode.
Determine the mode for a given data set	• Allow students to interrogate a set of data re: - highest - lowest - range - middle - most often - least often	• Define for the students the mode, mean and median.	• Encourage students to research and present on applications of mode, mean and median.

FORM 2

NUMBER			
CONTENT/SKILL	**REMEDIATION STRATEGIES**		
	LEVEL 1	**LEVEL 2**	**LEVEL 3**
State the place value of each digit in a numeral up to 999 999 999.	• Allow students to name numbers starting at 2-digit numbers • Engage students in matching exercises • Use a place value table to place the digits of a number	• Encourage students to solve crossword puzzles using numbers as the clues • Allow students to interact with word search puzzles with number names forming the set of clues • Guide students to identify the place value of underlined digits up to 999 999 999	• Engage students in finding the value of digits • Introduce students to the concept of expanded notation
Sequence the number names and numerals up to 999 999 999.	• Start naming small numbers: - 2 digit - 3 digit - 4 digit - 5 digits • Do matching games: names with numbers	• Guide students onto larger numbers: - 6 digit - 7 digit - 8 digit - 9 digit • Create crossword puzzles using numbers as the clues. • Create word search using word names as the clues	• Introduce number patterns to the students. - Repeating - Increasing - Decreasing • Allow students to develop sequences based on rules and description
Round numbers to the nearest tens, hundreds,	• Engage students with rounding to the nearest 10 • Allow students to round to the nearest 100	• Without the use a number line, allow students to round: - to the nearest 10 000 - to the nearest 100 000	• Provide opportunities for students to round to millions • Students vocalize the process • Use rounding to make estimations

NUMBER			
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	LEVEL 1	**LEVEL 2**	**LEVEL 3**
thousands and up to millions.	• Allow students to round to the nearest 1 000 using a number line		• Allow students to apply a similar technique to round to the nearest whole using fractions
Differentiate between or among square numbers and their square roots.	• Model the arrangement of objects in arrays to form rectangular, triangular and square numbers	• Students use group work to Investigate the types of numbers • Students are encouraged to present their findings and create visual representations	• Students are encouraged to investigate what happens if we add consecutive terms of triangular number • Encourage students to recognize different number sequences • Provide opportunities for students to interact with more complex number sequences
Calculate the Lowest Common Multiple (LCM) and Highest Common Factor (HCF) of a set of numbers.	• Allow students to create different rectangular/square arrays with a fixed number of objects • Guide students to the fact that the dimensions of the arrays are the factors • Use games to skip count to get multiples	• Allow students to create different arrays of the two numbers given one of the sides. • Guide students to look for common factors • Assist students to identify LCM	• Encourage students to develop the algorithm for HCF and LCM • Allow students to explore the notion of overlap/intersection of the factors
Convert from improper fraction to mixed number and vice versa.	• Allow students to re-cap the types of fractions: proper, improper and mixed numbers	• Use manipulatives to convert from improper fraction to mixed numbers • Guide students to developing an algorithm for the conversion.	• Allow students to apply the algorithms to do conversions on a worksheet

NUMBER			
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	LEVEL 1	**LEVEL 2**	**LEVEL 3**
	• Encourage students to use shaded regions of a whole to represent fractions • Use worksheets to enable students to identify fractions	• Engage students in converting mixed numbers to an improper fraction. • Guide students to develop an algorithm	
Create equivalent fractions.	• Use paper folding activities to show equivalence • Demonstrate equivalence using the fraction wall • Allow students to explore equivalent fractions using the set model	• Demonstrate how to reduce fractions to lowest form • Allow for independent practice using worksheets	• Encourage students to practice worded problems involving equivalent fractions
State the place value and value of digits in decimal fractions	• Guide students to review place value of whole numbers • Allow students to review the structure of a decimal • Use a place value table to allocate a place value of digits	• Encourage students to state the place value of digits in a decimal fraction without the use of a table	• Allow students to state the value of the digits in a decimal fraction • Use worksheets
Convert fractions to decimals.	• Encourage students to shade decimals on a 100 grid • Guide students to compare and order decimals using the 100 grid	• Model the conversion of fractions to decimals and vice versa • Allow students to order decimals. • Allow students to explore mixed number representation in decimals	• Engage students in finding place value in decimals • Assist students in discovering the movement of the decimal point when multiplying/dividing by multiples of 10

NUMBER			
CONTENT/SKILL	**REMEDIATION STRATEGIES**		
	LEVEL 1	**LEVEL 2**	**LEVEL 3**
			• Allow students to create and solve real-life problems involving decimals
Compare and order decimal fractions in ascending and descending order	• Allow students to use simple decimals to compare and order (one decimal place) • Start with two fractions then use three fractions • Remind students of ascending and descending order • Guide students to order decimals up to hundredths (use money as a parallel)	• Introduce students to more decimal places • Encourage students to use three fractions and order them	• Allow students to use more decimal places and use four decimal fractions to compare and order
Solve problems involving decimals (add, subtract, multiply, divide)	• Provide worksheets with simple problems involving decimals (no words). • Allow students to solve simple one-step problems involving decimals.	• Guide students to solve two-step problems involving decimals.	• Encourage students to solve reasoning multi-stem problems involving decimals.

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<tr><th>LEVEL 1</th><th>LEVEL 2</th><th>LEVEL 3</th></tr>
<tr><td>Convert among fractions, decimals and percent</td><td>• Review equivalent fractions.
• Guide students to creating equivalent fractions on a 100 square grid using simple fractions ($\frac{1}{2}, \frac{1}{4}, \frac{3}{4}$)
• Allow students to write these fractions as a percent.
• Encourage students to recall decimal fractions equivalent to the simple fractions
• Assist students to build a table showing the equivalence of these fractions
<table><tr><th>FRACTION</th><th>DECIMAL</th><th>PERCENT</th></tr><tr><td>$\frac{1}{4}$</td><td>0.25</td><td>25%</td></tr><tr><td>$\frac{1}{2}$</td><td>0.5</td><td>50%</td></tr><tr><td>$\frac{3}{4}$</td><td>0.75</td><td>75%</td></tr><tr><td>1</td><td>1.0</td><td>100%</td></tr></table></td><td>• Allow students to use the 100 grid to identify fractions such as $\frac{1}{10}, \frac{1}{5}, \frac{1}{20}$
• Guide students to expressing these fractions as percent.
• Encourage students to recall decimal fractions equivalent to the simple fractions.
• Allow students to build an equivalence table showing the equivalence of these fractions
<table><tr><th>FRACTION</th><th>DECIMAL</th><th>PERCENT</th></tr><tr><td>1</td><td>1.0</td><td>100%</td></tr><tr><td>$\frac{1}{5}$</td><td>0.2</td><td>20%</td></tr><tr><td>$\frac{1}{10}$</td><td>0.1</td><td>10%</td></tr><tr><td>$\frac{1}{20}$</td><td>0.05</td><td>5%</td></tr></table></td><td>• Guide the students exploration of fractions that involve fraction percent: $\frac{1}{3,}, \frac{1}{8}$
• Demonstrate the algorithm for converting from fraction to percent and vice versa.
• Allow students to develop the algorithm for converting from fractions to decimals.
• Provide opportunities for students to practice using worksheets.</td></tr>
<tr><td>Solve problems involving percent</td><td>• Demonstrate the algorithm for converting from fraction to percent and vice versa.</td><td>• Allow students to work independently on one-step problems involving percent</td><td>• Provide opportunities for students to solve multi-step problems involving percent.</td></tr>
</table>

NUMBER			
CONTENT/SKILL	**REMEDIATION STRATEGIES**		
	LEVEL 1	**LEVEL 2**	**LEVEL 3**
	• Guide students towards solving problems involving finding a percent of a set • Guide students to represent a subset of a set of objects as a percent • Allow students to solve one-step problems involving percent. e.g. A box contains 35 red pens and 65 blue pens. What percentage of the pens in the box are blue?	• Encourage students to solve two-step problems in groups	• Start with scaffolded problems then introduce reasoning questions without the scaffold

MEASUREMENT			
CONTENT/SKILL	**REMEDIATION STRATEGIES**		
	LEVEL 1	**LEVEL 2**	**LEVEL 3**
Solve problems involving - Length - Mass and Weight - Time	• Pose problems for hands-on exploration using items at home and in the classroom • Use concrete manipulatives - to compare length e.g. interlocking cubes, paperclips, pattern blocks	• Present novel simple explicit real-life problems and allow students to define the problem in their own words e.g. - A classroom height chart allows students to discuss and compare heights	• Decode word problems having more complex technical vocabulary analogous with length, mass and weight, time • Allow students to explore a novel problem, discuss their solutions, document their process

MEASUREMENT			
CONTENT/SKILL	**REMEDIATION STRATEGIES**		
	LEVEL 1	**LEVEL 2**	**LEVEL 3**
	- to compare masses e.g. balance, weights • Use real-life activities to compare time e.g. washing hands, reading a book, sleeping at night, a day a school, the length of a school term • Develop students' technical vocabulary to include words analogous with - length e.g. shorter, longer, taller, wider, further, width - mass and weight e.g. light, lighter, heavy, heavier, equal - time e.g. before, after, duration, how long, schedule, earlier, later, faster, slower • Teach the necessary technical vocabulary	- A balance or a scale allows students to discuss and compare masses and weights - A daily schedule and calendar allows students to discuss ▫ start time ▫ end time ▫ lapsed time ▫ time between events ▫ time until another event • Use problems at the readability level of the students • Incorporate multiple approaches to problem solving • Carefully sequence diverse examples • Elicit students' explanations and respond to students' misconceptions with curiosity • Use Bar Modeling Representations to Decode Word Problems	• Use rich contexts for discovery-based learning • Choose a mnemonic to help students recall familiar strategies e.g. - CUBES – Circle the numbers, Underline the question, Box the key words, Evaluate and Eliminate, and Solve and Check - RIDE - Remember the problem correctly, Identify relevant information, Determine the operations and unit for expressing the answer, and Enter the correct numbers, calculate and check the answer - SOLVE - Studying the problem, Organizing the facts, Lining up a plan, Verifying the plan with action, and Evaluating the answer - STAR - Searching the word problem, Translating the words into an equation, Answering the problem, and Reviewing the problem

MEASUREMENT			
CONTENT/SKILL	**REMEDIATION STRATEGIES**		
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			• Go through the specific steps involved in using the mnemonic to show students how to use it to retrieve information. • Practice all the steps of the strategies with the students, until they can practice them independently and retrieve the information correctly.
Calculate the perimeter of plane shapes	• Review the conservation of length • Discuss perimeters in everyday life e.g. - the border around the blackboard - a lap around the field during training • Allow students to trace the perimeter of simple plane shapes • **Calculate** the perimeter of - rectangles - squares • Guide students to develop patterns and relationships that lead to formulas	• Discuss the application of to **calculate** perimeters of compound shapes • **Measure** the perimeter of rectilinear figures using, - Geoboards - Dot paper - Grid paper • Allow students to trace the perimeter of compound plane shapes with arcs • Allow students to **calculate** the circumference of a circle using its - diameter - radius	• Allow students to **calculate** the perimeter of complex plane shapes, including - a quarter-circle - a semi-circle • Teach students to develop mental models for common lengths • Guide students to develop patterns and relationships that lead to formulas • Engage in projects and activities that require measuring distances along a border

MEASUREMENT			
CONTENT/SKILL	**REMEDIATION STRATEGIES**		
	LEVEL 1	**LEVEL 2**	**LEVEL 3**
	• **Measure** the perimeter of squares and rectangles using, - geoboards - dot paper - grid paper • **Measure** the diameter and circumference of circles using string and a ruler • Compare the diameter and circumference of a circle • Allow students to determine the relationship between the diameter and circumference of a circle	Allow students to use the radius and diameter to calculate - one quarter of the circumference - one half of the circumference - three quarters of the circumference	
Solve problems involving percentage (calculate profit and loss, percentage profit and loss, sales tax and discount	• Pose problems for hands-on exploration using items at home and in the classroom - base ten blocks - geoboard - dot paper for hundred chart - grid paper for hundred chart - Cuisenaire rods e.g. Use an area model of a 10×10 square on the geoboard to represent, - one half	• Provide a mixture of situations to help students distinguish between situations thar can be easily solved mentally and those which require pencil and paper • Teach percent through situations involving proportions • Teach the proportional relationship that can be used to solve percent problems: $\frac{\text{part}}{\text{whole}} = \frac{\%}{100}$, involving numbers that allow	• Introduce percents greater than 100 using - the area model - Cuisenaire rods • Proportional reasoning can be used when the solution depends on values that change over time using the format $\frac{\text{change}}{\text{starting value}} = \frac{\%}{100}$ • The cross-product algorithm, though it is the most efficient

MEASUREMENT			
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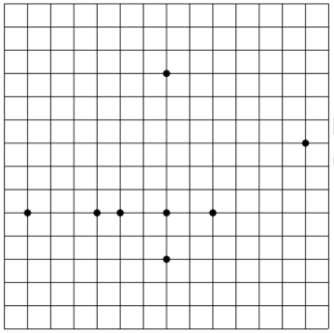
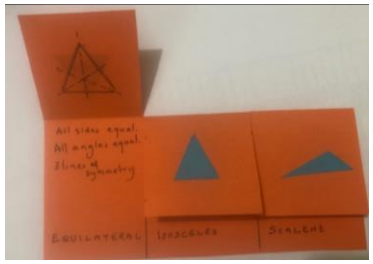
	LEVEL 1	**LEVEL 2**	**LEVEL 3**
	- one quarter/fourth - one fifth - one tenth - fractions with a denominator of 100 • Express the unit fractions above as equivalent fractions with a denominator of 100 • Guide students to develop patterns and relationships that lead to a strategy to convert a simple unit fraction to a percent • Discuss terms used in connection with percent - rate - percentage • Set up a simulated class enterprise and teach the technical vocabulary - profit - loss - percentage profit - percentage loss - sales tax - discount	students to use equivalent fraction to find the solution	method should be the last method introduced to students for solving

MEASUREMENT			
CONTENT/SKILL	**REMEDIATION STRATEGIES**		
	LEVEL 1	**LEVEL 2**	**LEVEL 3**
Calculate the area of triangles, squares and rectangles	• Use manipulatives to support learning of concepts by creating physical models that become mental models for concepts and processes • Introduce area using manipulatives - geoboards - colour tiles - base ten blocks - tangrams - pattern blocks - fraction models • Allow students to **measure** areas and reinforce the concept of area using a square unit	• Teach the conservation of area • Use an array of rows and columns on a geoboard or grid to define the dimension of rectangles and squares in terms of - length and width - base and height Next, **calculate** how many tiles form the area of the shape • Guide students to associate area measure on a grid with arrays for multiplication using, - rectangles - squares • Use teacher led activities with area conservation to understand measures of area for triangles	• Teach calculation of areas of rectangles and squares using an array of square tiles of varying rows, columns, lengths, widths, bases, heights • Teach the technical vocabulary used in formulae • Use teacher led activities with area conservation to understand area formulas for triangles

GEOMETRY	
CONTENT/SKILL	**REMEDIATION STRATEGIES**

<table>
<tr><th></th><th>LEVEL 1</th><th>LEVEL 2</th><th>LEVEL 3</th></tr>
<tr><td>Classify quadrilaterals according to their attributes</td><td>• Review quadrilaterals in terms of number of sides, number of angles, lines of symmetry.
• Create an “always, sometimes, never” table to list the attributes of the quadrilaterals.</td><td>• Construct quadrilaterals having described attributes.
• Identify quadrilaterals having described attributes.</td><td>• Join points on a grid to create quadrilaterals having prescribed attributes.
 
• Pose word problems involving quadrilaterals.</td></tr>
<tr><td>Classify triangles based on their properties as acute angled, right angled, obtuse angled, isosceles, equilateral, and scalene</td><td>• Create a foldable to reinforce the attributes of the different types of triangles
  </td><td>• Have students create a table to highlight the attributes of the different types of triangles
<table><tr><th>Type of Triangle</th><th>No. of equal Sides</th><th>No. of equal Angles</th><th>Lines of Symmetry</th></tr><tr><td>Equilateral</td><td></td><td></td><td></td></tr><tr><td>Isosceles</td><td></td><td></td><td></td></tr><tr><td>Scalene</td><td></td><td></td><td></td></tr></table></td><td>• Pose word problems involving the types of triangles</td></tr>
</table>

STATISTICS			
CONTENT/SKILL	**REMEDIATION STRATEGIES**		
	LEVEL 1	**LEVEL 2**	**LEVEL 3**
Interpret data from bar graphs	• Associate each bar with - a length/height which provides information - an object/attribute being measured • Associate the height/length of the bar, including zero units, with a frequency which is a measure of the object/attribute • Teach the following, - the height/length of the bar is read from a point on the axis of frequency - the bars can be all vertical or all horizontal - the widths of all the bars are equal - the spacing between the bars is equal • Teach the technical vocabulary - axis (singular) - axes (plural) - height/length - horizontal - vertical	• Teach that the frequency can be a number, or a quantity which has a unit • Provide models of bar graphs for students to identify - the frequency associated with each bar - what object/attribute is represented by each bar - total number of objects/attributes represented on the bar graph • Allow students to explore and discuss what information is provided in comparing bars - the meaning of equal bar heights/lengths - the comparison between bars of different heights/lengths	• Teach the relationship between scales and frequencies using proportions • Provide models of bar graphs for students to identify frequencies by applying information from a scale • Pose problems which allow students to interpret data, - to find missing bits of information - to make inferences

STATISTICS			
CONTENT/SKILL	**REMEDIATION STRATEGIES**		
	LEVEL 1	**LEVEL 2**	**LEVEL 3**
	- frequency - scale - title		
Solve problems involving mode, median and mean	• Provide simple contexts which allow students to solve problems using concrete manipulatives • Guide students understanding of - the steps involved in a process - the rationale for the process - how, when, and why is the specific "average" applicable or useful for particular problems • Teach the technical language and allow students to verbalise their own thinking using the technical vocabulary - average - mode - median - mean	• Demonstrate clear modeling of the solution specific to the problem • Think aloud specific steps during modeling • Present multiple examples of the problem and applying the solution to the problems • Providing immediate corrective feedback to students on their accuracy	• Prompt student for responses • Ask questions for understanding • Allow students to complete parts of the solution he/she can do correctly • Gradually transfer responsibility to the student for an increasing number of steps in the solution • Plan systematically for the student to take full responsibility

FORM 3

NUMBER OPERATIONS AND NUMBER THEORY			
CONTENT/SKILL	**REMEDIATION STRATEGIES**		
	LEVEL 1	**LEVEL 2**	**LEVEL 3**
Order integers	• Use algebra tiles as a concrete manipulative to represent whole numbers • Represent order horizontally and vertically with whole numbers • Use algebra tiles as a concrete manipulative to represent integers • Represent the order of integers using algebra tiles	• Use the horizontal and vertical number lines to demonstrate increasing and decreasing order of whole numbers • Allow students to create their own number lines to demonstrate increasing and decreasing order of integers	• Create number lines for a specific range of numbers • Use the number line to insert missing integers • Order integers using increasing and decreasing patterns
Perform the four basic operations on integers	• Teach the idea underlying an operation - adding means putting together - multiplication involves joining equal groups - subtraction means removal - division means partitioning into equal groups • Teach the relationship within and between operations • Perform basic operations with algebra tiles or two-sided counters - on positive integers only	• Use analogies to explain the four basic operations with integers • Perform basic operations with algebra tiles using a combination of positive and negative integers • Guide students in strategy formation to develop and reinforce mental strategies	• Use of Math games aligned to the behavioural objective • Make comparisons and conjectures based on the combination of integers and operators e.g. 5 + 4 5 – 4 - 5 + 4 - 5 – 4 5 × 4 5 × - 4 - 5 × 4 - 5 × - 4

NUMBER OPERATIONS AND NUMBER THEORY			
CONTENT/SKILL	**REMEDIATION STRATEGIES**		
	LEVEL 1	**LEVEL 2**	**LEVEL 3**
	- on negative integers only • Teach mental strategies such as adding with doubles, doubles plus one, using - a matrix - a ready reckoner - a number line • Help learners develop a concrete resource to aid as a learning tool		• Teach the order of operations with integers
Apply the commutative, associative and distributive laws	• Present real-life examples in a specified sequence • Using concrete materials to expose a pattern - Counters - Geoboards • Explore the properties using - arrays - area models • Present as many examples as possible and allow students to work in groups	• Guide students' development in how to transform concrete models to pictorial representation • Teach the technical language - commutative - distributive - operators - parentheses/brackets • Allow students to make presentations to practice verbalising the process using the technical vocabulary	• Present a variety of examples, - word problems using real-life contexts - simple abstract contexts using number sentences with missing elements for students to solve • Guide students' development in how to transform pictorial representations to abstract models • Teach the meaning of the symbols
Explain the concept of a) closure	• Introduce the concepts using concrete manipulatives - counters - algebra tiles	• Allow students to represent the concepts using diagrams • Review the relationship between operations	• Allow students to share examples representing each property and allow discussion withing groups to

<table>
<tr><th colspan="4">NUMBER OPERATIONS AND NUMBER THEORY</th></tr>
<tr><th rowspan="2">CONTENT/SKILL</th><th colspan="3">REMEDIATION STRATEGIES</th></tr>
<tr><th>LEVEL 1</th><th>LEVEL 2</th><th>LEVEL 3</th></tr>
<tr><td>b) the identity element and
c) inverse operator</td><td>• Teach the symbols used in mathematics and what they mean
• Review number theory for sets of numbers
- Natural numbers
- Whole numbers
- Integers
- Real numbers
• Allow students to practice using the four basic operations on the elements of each set of numbers</td><td>- addition and subtraction
- multiplication and division
• Guide students in using flowcharts to reverse and operation
• Teach the technical language
- set
- element
- binary operation
- additive identity
- multiplicative identity
- inverse
- symbols</td><td>practice using the technical vocabulary
• Have students work in groups to represent each property using all three approaches
- concrete
- pictorial
- abstract</td></tr>
<tr><td>Express a value
a) to a given number of significant figures
b) using standard form and
c) in scientific notation</td><td>• Present real-life examples of each for students to investigate the mathematical structures
• Provide a broad range of selected and sequenced instructional examples
• Identify the attributes of the format of each expression
• Teach mathematically precise definitions of technical vocabulary
- place value
- round up
- round down</td><td>• Allow students to define each format using the technical vocabulary
• Use a table for students to represent numbers using all three formats
•
<table><tr><th>Standard Form</th><th>Significant Figures</th><th>Scientific Notation</th></tr><tr><td></td><td></td><td></td></tr></table></td><td>• Provide review opportunities that,
- extend previously learned content
- help students discriminate when and when not to apply recently learned skills
• Provide timely academic feedback to correct student errors and address misconceptions</td></tr>
</table>

NUMBER OPERATIONS AND NUMBER THEORY			
CONTENT/SKILL	**REMEDIATION STRATEGIES**		
	LEVEL 1	**LEVEL 2**	**LEVEL 3**
	- significant - base - mantissa - exponent - decimal		
Convert a numeral given in any base to a base 10 numeral	• Explore real-life examples of number bases - computing, base 2 - money, base 10 - Time, base 60 • Teach the technical vocabulary - binary - denary • Teach students to count in base 2 • Guide the discussion of number bases using students' experiences counting in base 2 and base 10 - To identify the digits used in a base - To understand the base system	• Allow students to explore and develop place value charts for 4-digit numbers in base 2 to base 10 • Teach the conversion from one base to another - model the procedure, while describing the process - guide students time to work through several problems - highlight the different structures in converting different bases - solicit students' responses to check for understanding - give immediate and direct feedback • Scaffold instruction - students solve problems in small - teacher provides prompts	• Pose problems students may discuss with each other for practice • Check for understanding and keep students engaged • Review important vocabulary, concepts, and procedures. • Monitors students' feedback and provide corrective feedback in a positive manner • Students may discuss problems with each other. •

NUMBER OPERATIONS AND NUMBER THEORY			
CONTENT/SKILL	**REMEDIATION STRATEGIES**		
	LEVEL 1	**LEVEL 2**	**LEVEL 3**
		- teacher solves problems with the students • Identify and provide instruction for students who need reteaching or additional practice	

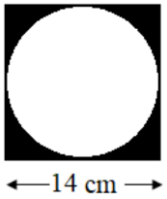
ALGEBRA			
CONTENT/SKILL	**REMEDIATION STRATEGIES**		
	LEVEL 1	**LEVEL 2**	**LEVEL 3**
Substitute integers for unknown quantities in mathematical statements	• Teach to develop students' understanding of the structure of algebraic representations • Clearly identify the skills and concepts and highlight important details • Connect the new content to previous learning • Provide precise instructions • Use task analysis to breaks complex skills into smaller, more manageable chunks	• Model concepts or procedures in a step-by-step manner and verbalise the thought process while demonstrating the concept or procedure • Allow students to explain the steps in the solution the problem, and the justification when necessary • Presents lessons that scaffold each another, - move from simple skills and concepts to complex	• Provide specific feedback about correct and incorrect actions, and allow time to correct errors • Reteach and clarify instructions for corrective feedback • Provide opportunities to practice • Provide scaffolded instruction moving from guided practice to independent practice

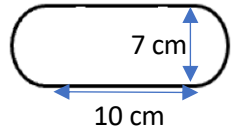
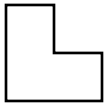
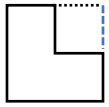
ALGEBRA			
CONTENT/SKILL	**REMEDIATION STRATEGIES**		
	LEVEL 1	**LEVEL 2**	**LEVEL 3**
	• Emphasise the order of operations • Teach the technical vocabulary - base - exponent - binary operator - order of operation - simplify - apply the distributive law - coefficient - variables	- move from high-frequency skills to low-frequency skills • Prioritise and sequence tasks from easy to more difficult • Scaffolds instruction by providing temporary supports e.g. written prompts	
Solve linear equations of increasing level of difficulty with variables on both sides	• Provide explicit instruction in how to solve problems - the steps of a strategy - the rationale of a strategy - how, when, and why is a strategy applicable for specific problems	• Allow small-group comparison and discussion activity - to share and compare multiple solution strategies - to use precise mathematical language to describe solution steps - to explain reasoning and mathematical validity	• Teach alternative strategies and have students compare them to develop a deeper understanding of the strategy they choose to use. • Develop students understanding so they can use their selected strategy flexibly to solve novel problems
Represent linear inequalities on the number line	• Review the attributes of a number line using a concrete model • Teach the meaning of the inequality symbols - >$$>$$ - <$$<$$ - ≥$$\geq$$	• Model the steps in the problem - verbalise the procedures - highlight the symbols used - emphasise the meaning of the symbols - explain the thinking process	• Allow students to describe or think-aloud the reasoning being used - to analyse the problem structure - to determine their solution strategy - to solve the problem

ALGEBRA			
CONTENT/SKILL	**REMEDIATION STRATEGIES**		
	LEVEL 1	**LEVEL 2**	**LEVEL 3**
	- ≤ • Begin developing the skill using simple inequalities of the form - $x > c$ - $x < c$ - $x \geq c$ - $x \leq c$ • Guide students to identify the ranges on the number line which represent - a specific set of x - values where ▫ x is more than a stated value ▫ x is less than a stated value ▫ x is equal to a stated value ▫ x lies between two values - a specific set of y - values where ▫ y is more than a stated value ▫ y is less than a stated value ▫ y is equal to a stated value ▫ y lies between two values • Guide students through steps with precise instructions using he technical vocabulary	- discuss the decision-making process • Pose problems for practice and guide students - to select a solution strategy - to carry out the steps in the solution • Increase the level of difficulty by varying the structure of the inequality - $ax > d$, $ax \pm b > c$ - $ax < d$, $ax \pm b < c$ - $ax \geq d$, $ax \pm b \geq c$ - $ax \leq d$, $ax \pm b \leq c$ • Display work from past or current students to demonstrate examples of students using multiple strategies	- to analyse their peers' solutions • Provide immediate feedback at an appropriate time during students' presentations and discussions

SETS, RELATIONS AND FUNCTIONS			
CONTENT/SKILL	**REMEDIATION STRATEGIES**		
	LEVEL 1	**LEVEL 2**	**LEVEL 3**
Differentiate among a) a relation, b) a mapping and **c)** a function	• Review number patterns and number sequences • Present examples from real-life contexts to represent the concepts • Allow students to explore and investigate before discussing the structures of the concepts • Guide students in - listing the attributes of each structure - making comparisons stating the relationships - recognising when patterns and rules are present - appreciating the importance of order • Teach the technical terms - element - ordered pair - domain - range - mapping rule - set	• Present a broad range of selected and sequenced instructional examples • Guide students to identify the concepts from different modes of representation - ordered pairs - mapping - tables - graphs on the Cartesian plane • Highlight specific examples with pictorial representation - one-to-one mapping - many to many mapping - many to one mapping - linear function - quadratic function • Allow students to define the concepts using the technical vocabulary	• Provide instructional scaffolding giving temporary guidance while students learn the new concepts • Provide practice opportunities that allow students, - to verbally convey their mathematical understanding - to work with visual representations of concepts • Provide timely feedback • Provide frequent well-designed review opportunities that are appropriately spaced over time

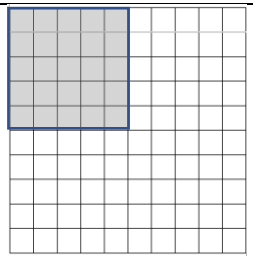
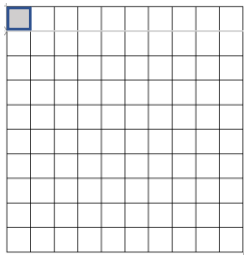
MEASUREMENT			
CONTENT/SKILL	**REMEDIATION STRATEGIES**		
	LEVEL 1	**LEVEL 2**	**LEVEL 3**
Convert quantities from one system of measure to another using the unitary method	• Review the multiplication and division of numbers by 10 and powers of 10. Use only whole numbers • Encourage students to interact with measuring scales to determine - the number of mm in 1 cm - the number of cm in 1 m • Model the conversion of whole cm to mm and vice versa • Allow students to extend the idea to convert whole m to cm and vice versa	• Review the multiplication and division of decimals by 10 and powers of 10 • Guide the students to convert cm to mm – include simple fractions $(\frac{1}{2}, \frac{1}{4}, \frac{1}{5})$. • Allow students to convert from m to cm/mm and vice versa	• Apply the conversion to problems involving the four operations, e.g. - What is the area in square metres, of a square of side 25 cm? - Aliya had 1.75 m of ribbon and she used two fifths of it to make a flower. How much ribbon did she have remaining?
Convert the units for area	• Explain to students the meaning of a unit square • Allow students to explore how many unit squares there are in a square of side 2cm, then 3 cm, then 4cm • Have the students examine the pattern formed by the side of the square and the number of unit square • Allow students to deduce the relationship between the unit square and the square meter.	• Allow students to build a table to show the side of a square and the area. • Allow the students to deduce the number of square cm in a square m. • Provide worksheets for students to practice the conversion of cm^2 to m^2	• Teach the conversion from cm^2 to m^2 by first converting the dimensions of the shape to meters • Use worksheets for independent practice

MEASUREMENT			
CONTENT/SKILL	**REMEDIATION STRATEGIES**		
	LEVEL 1	**LEVEL 2**	**LEVEL 3**
Use the formula for the circumference of a circle	• Review the circle- diameter, radius circumference and area • Allow students to measure the diameter and circumference of several circles and record on a table • Have the students divide the circumference by the diameter in each case • Check for students' recall of pi. $\pi = \frac{C}{d}$	• Allow students to make C the subject of the formula in the equation $\pi = \frac{C}{d}$ • State the formula for finding the circumference of a circle • Allow students to work independently on problems involving finding the circumference given the radius or the diameter and finding the radius given the circumference. Use circles whose radii are multiples of 7 and $\pi = \frac{22}{7}$	• Use π = 3.14 to find the circumference of a circle. • Encourage students to compare the accuracy of the circumference using the decimal and fraction values of pi
Estimate the area of a circle	• Have the students cut a circle into 16 pieces by first folding into half then quarters. Each quarter is then cut into 4 pieces 	• Allow students to vocalize the difference between circumference and area • Review the formula for circumference and area • Encourage students to practice finding area given radius/diameter or vice versa	• Introduce more complex problems involving area of a circle and allow students to brainstorm a method of solution 

MEASUREMENT			
CONTENT/SKILL	**REMEDIATION STRATEGIES**		
	LEVEL 1	**LEVEL 2**	**LEVEL 3**
	Arrange the 16 pieces as follows:  This approximates to a rectangle of length $\frac{C}{2}$ and width r. Area of rectangle: = L × B = $\frac{C}{2} \times r = \frac{2\pi r}{2} \times r = \pi r^2$ Therefore, Area of Circle = πr^2		
Calculate the area of compound shapes involving a) triangles b) quadrilaterals c) circles and d) circle quadrants	• Encourage students to build compound shapes from a given set of shapes • Give students a compound shape and have them divide it into simpler shapes to find the area  • Review the formula for area of a square, rectangle and a triangle	• Demonstrate how to find the area of a compound shape • Use worksheets to allow for independent practice • Demonstrate that some compound area can be found by subtracting two areas 	• Introduce the surface area of a solid – incorporate the net of the solid
Use proportional techniques	• Use students' knowledge to explain direct proportion:	• Teach students how to apply the direct proportion to solve problems	• Guide students to explore situations where there seem to be a

MEASUREMENT			
CONTENT/SKILL	**REMEDIATION STRATEGIES**		
	LEVEL 1	**LEVEL 2**	**LEVEL 3**
	- If 1 soft drink costs $5, then 10 soft drinks will cost $50 - Explore how the answer is obtained • Ask students to give examples of an inverse proportion: the slower you drive, the longer it will take to reach a destination	• Encourage students to solve one-step problems involving proportional reasoning	proportion but there is no proportion - E.g. If Isaiah is 2 years old and Nari is 8 years old. How old will Isaiah be when Nari is twice her current age • Allow students to solve multi-step problems involving proportion
Solve problems involving a) volume b) capacity c) time d) distance **e)** speed	• Teach using concrete materials and real-life contexts • Explore every day - non-standard units for ▫ volume ▫ capacity - standard units for ▫ volume ▫ capacity Discuss real-life examples and contexts for - time - distance - speed • Compare the use of standard and non-standard units of measure	• Begin by posing a problem and allowing students to solve using graphical representations and manipulatives • Teach using eclectic strategies - manipulatives - simulations - modeling - representations - verbal rehearsal - cueing - feedback • Use explicit instruction • Select and sequence instructional examples • Model solutions step-by-step	• Teach heuristics to solve word problems e.g. - trial and error - Guess and check • Encouraging students to verbalize - their own strategies - strategies modeled by the teacher • Students learn to use structure to identify word problems. e.g. - comparison problems when comparing two amounts - change problems when an amount changes - combine problems when amounts are combined

MEASUREMENT			
CONTENT/SKILL	**REMEDIATION STRATEGIES**		
	LEVEL 1	**LEVEL 2**	**LEVEL 3**
		• Begin with guided practice and transition to independent practice with regular teacher feedback	• Teach students how to read problems and organize work according to the structure of the problem
Calculate the total Hire Purchase price	• Encourage a discussion about what students understand by Hire Purchase. Use the appropriate vocabulary: down payment, interest monthly total cost • Use an advertisement in a newspaper/magazine to work out the total cost of an item	• Have students work out the Total cost of an item on Hire Purchase • Compare the Cash Price with the Hire Purchase price • Engage the students in a discussion about the merits and demerits of Hire Purchase	• Encourage students to do a mini project on the best hire purchase option for purchasing an item • Have the students compare the cash price with the hire purchase price
Explain the concept of percent	• Percent is the shortened for the Latin "Per Centum" – out of 100 • Use a 100 grid as a whole and ask students to shade parts of this whole.	• Teach the algorithm for converting fractions to percent • Allow students to deduce the conversion of percent to fraction • Encourage students to create a table of simple fractions and their percent equivalent $\frac{1}{2}.\frac{1}{4},\frac{1}{5},\frac{1}{10}$	• Encourage students to create a table of more complex fractions and their percent equivalent e.g. $\frac{1}{3}.\frac{1}{20},\frac{1}{8}$ • Engage students in representing Improper fractions and mixed numbers as percent. • Allow students to find a percent of a set.

MEASUREMENT			
CONTENT/SKILL	**REMEDIATION STRATEGIES**		
	LEVEL 1	**LEVEL 2**	**LEVEL 3**
	 25 parts shaded = 25%  1 part shaded = 1%	• Have students create small one line charts with the information for placing on the walls of the classroom	• Encourage students to find the whole given a percentage
Convert currency using rates	• Encourage a discussion of various currency - Australian - Bolivar - Canadian - Eastern Caribbean (EC) - Pound - United States Dollar (USD)	• Encourage students to discuss whether they should multiply or divide by the rate in different given scenarios • Use exercises to have students practice	• Teach the conversion when going from one currency to another through an intermediary currency E.g. EC $1 = TT $ 3 EC $1 = US $0.50 How much US $ can be bought with TT $100?

MEASUREMENT			
CONTENT/SKILL	**REMEDIATION STRATEGIES**		
	LEVEL 1	**LEVEL 2**	**LEVEL 3**
	- Yen • Use the newspaper to discuss the different currency rates • Use a simple conversion 2:1 to introduce the concept of converting currency		• Allow students to practice independently using worksheets.

GEOMETRY			
CONTENT/SKILL	**REMEDIATION STRATEGIES**		
	LEVEL 1	**LEVEL 2**	**LEVEL 3**
Calculate the size of an exterior angle given the size of the interior angle	• Review types of angles using concrete materials, including the supplementary angle • Allow students to use concrete manipulatives to create n-sided polygons - geoboards - Straws - sticks	• Allow students to use a geoboard to split a polygon into triangles • Students investigate the relationship between the number of sides on a polygon and the number of triangles formed when a polygon is split	• Explore a wide range of examples to develop the students' skill for application to a wider range of problem types

GEOMETRY			
CONTENT/SKILL	**REMEDIATION STRATEGIES**		
	LEVEL 1	**LEVEL 2**	**LEVEL 3**
	• Explore the angles that are formed when two sides meet, - at the interior of the polygon - at the exterior of the polygon • Present multiple examples using a range of polygons • Teach the technical vocabulary - polygon - interior angle - exterior angle		
Classify the angles formed when parallel lines are cut by a transversal	• Allow students to identify the different types of angles in their natural environment • Students use hands-on materials to model concepts • Students use the geoboard to show - parallel lines - the transversal - angles formed • Present examples in a specified sequence to expose a pattern	• Pose questions allowing students to use visual representations to explore concepts • Guide students to investigate models and compare the angles formed • Teach the technical vocabulary - alternate angle - corresponding angle - co-interior angles - vertically opposite angle	• Allow students to label angles in diagrams • Allow students to match names and angles
Use a pair of compasses and a straight edge to bisect an angle	• Review the technical vocabulary - compass point - angle - arc	• Provide simple succinct instructions using the technical vocabulary • Sequence activities for student practice	• Allow students to execute all the steps in the process independently • Increase the complexity of the task E.g. Construct a 135° angle by

GEOMETRY			
CONTENT/SKILL	**REMEDIATION STRATEGIES**		
	LEVEL 1	**LEVEL 2**	**LEVEL 3**
	- line segment - ray - vertex • Allow students to practice - draw a line segment with a ruler - draw an arc to cut two rays - draw a ray from a point/vertex	• Allow students to verbalise their process using the technical vocabulary	- bisecting a 180° angle - bisecting a 90° angle - joining the 90° and 45° angles

STATISTICS			
CONTENT/SKILL	**REMEDIATION STRATEGIES**		
	LEVEL 1	**LEVEL 2**	**LEVEL 3**
Calculate the mean, median and mode from a frequency distribution of ungrouped data	• Present a frequency distribution and allow students to model the ungrouped data using manipulatives e.g. the height of a stack of cubes will represent the frequency • Teach the technical vocabulary - statistic - frequency	• Mean - Allow students to begin with stacks of cubes of varying heights and combine them into one pile. Next rebuild the same number of stacks one row at a time, until all the cubes are used. Associate the process with the four basic operations	• Allow students to explore novel problems, discuss their process and define an algorithm that describes the procedures for calculating - the mean - the median - the mode • Allow students to practice independently

STATISTICS			
CONTENT/SKILL	**REMEDIATION STRATEGIES**		
	LEVEL 1	**LEVEL 2**	**LEVEL 3**
	- frequency distribution - ungrouped data • Mean - Allow students to begin with stacks of cubes of varying heights and "level off" the heights so that they are all the same, using trial and error • Median - Allow students to begin with an odd number of stacks of cubes of distinct heights and arrange them in ascending or descending order, then choose the stack in the middle • Mode - Allow students to begin with stacks of cubes with distinct heights where each stack represents a statistic, then choose the stack with the greatest height and relate the chosen stack to its statistic	• Median - Allow students to begin with stacks of cubes of varying heights ▫ vary between odd and even numbers of stacks ▫ use two or three stacks with the same height and arrange them in ascending or descending order, then ▫ choose the stack in the middle if the number of stacks is odd ▫ choose the imaginary height halfway between the two middle heights if the number of stacks is odd. • Mode - Allow students to begin with stacks of cubes where each stack represents a statistic and some heights are the same, then choose the stack(s) with the greatest height and relate the chosen stack(s) to its (their) statistic	

STATISTICS			
CONTENT/SKILL	**REMEDIATION STRATEGIES**		
	LEVEL 1	**LEVEL 2**	**LEVEL 3**
Interpret information from a) pie charts b) bar graphs c) histograms d) line graphs	• Initiate student activities with carefully selected - Manipulatives e.g. fraction circles, cubes and square tiles - graphical representations e.g. electronic spreadsheets with charts • Develop the technical vocabulary • Develop a ritual or structure for selecting and sequencing instructional examples • Use data representation from real-life contexts e.g. - Newspapers - Sports magazines - Journal articles • Provide feedback on students' individual insights	• Developing meaning, then automatization • Allow students to describe of the attributes of the graph or chart • Compare the attributes and uses among different graphs and charts modes of representation • Allow students to use the technical vocabulary to present their own findings from the graph or chart E.g. share and discuss - strategies - explanations - procedures	• Teach students how to make conjectures from their findings • Foster and guide the process for students' development of abstraction

RECOMMENDATIONS FOR PARENTS

FORMS ONE, TWO & THREE

NUMBER OPERATIONS AND NUMBER THEORY

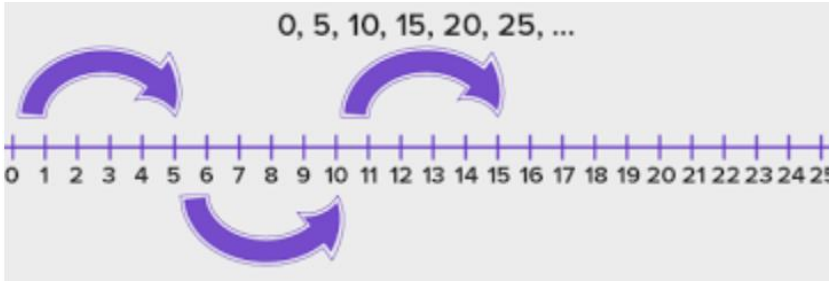
- Allow your child to use measuring cups and measuring spoons in recipes.
- Encourage your child to calculate the quantities for multiple/fractions of the recipe.

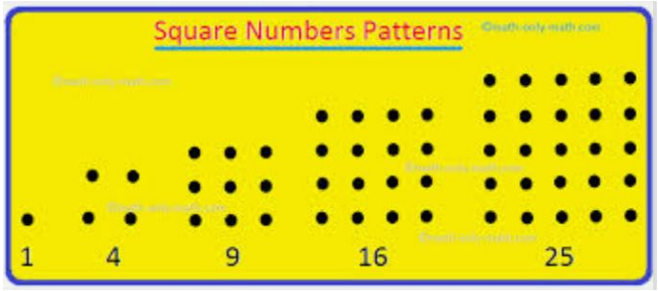
- Talk the language of fractions when mixing liquids – making juice, adding bleach to water, mixing fertilizer for the garden.

- Use the language of fractions when sharing fruits, money, food.

NUMBER OPERATIONS AND NUMBER THEORY

- Use fractions when stipulating time: you have quarter of an hour to get to the shop and back.
- When cooking, if the recipe is for 6 servings, ask your child to explain what he or she would need to do to work out the quantities of ingredients for 3, 4 or 10 servings.
- Help your child understand patterns by showing the repeating at least three times. For example, in the pattern 64, 32, 16, 8, the pattern could be described as divide the number by 2, divide the number by 2, divide the number by 2.
- Create a numerical pattern then ask your child to predict the number that will appear in a later term or place in the pattern. For example, ask your ask to predict the number that will appear in the ninth place in a pattern such as 4, 9, 15, 22, 30, 39





- Allow your child to explore a variety of ways that patterns can help him or her remember mathematics facts. For example, if your child cannot recall the product (answer) of 6 × 4 but knows that 6 × 2 = 12, then he or she can apply the knowledge of the two times table to the four times table by using the strategy of doubling. When the product (answer) of 6 × 2 is doubled, it is the same as the product (answer) of 6 × 4.

NUMBER OPERATIONS AND NUMBER THEORY

- Encourage your child to read nutrition labels. Have them calculate the percent of a specific nutrient in each item.

Nutrition Facts

6 servings per container

Serving size **1 cup (230g)**

Amount per serving

Calories **245**

	% Daily Value*
Total Fat 12g	**14%**
Saturated Fat 2g	**10%**
Trans Fat 0g	
Cholesterol 8mg	**3%**
Sodium 210mg	**9%**
Total Carbohydrate 34g	**12%**
Dietary Fiber 7g	**25%**
Total Sugars 5g	
Includes 4g Added Sugars	**8%**
Protein 11g	

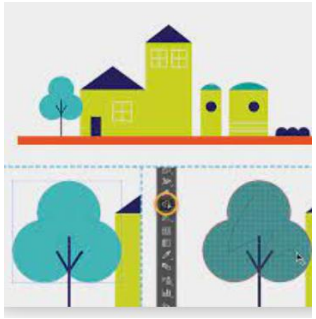
Vit. D 4mcg 20%	Calcium 210mg 16%
Iron 3mg 15%	Potassium 380mg 8%

*The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

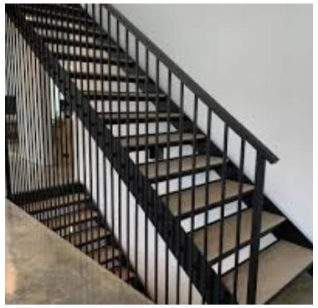
- Encourage your child to access additional support on the Ministry of Education's learning platform at learn.moe.gov.tt

GEOMETRY

- Create a game of spotting solids/shapes and naming them while on a walk/drive.



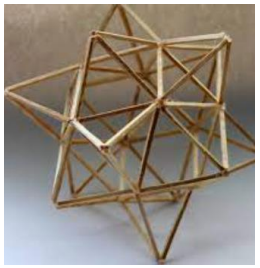
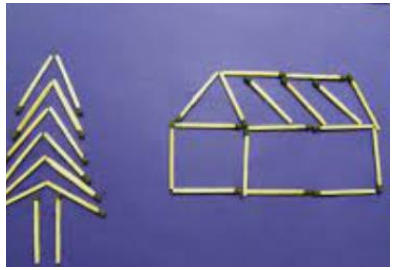
- Play a game of spotting parallel lines in everyday objects – ladder, window, stairs.



- Create a bike trail with chalk in the yard using parallel lines.

GEOMETRY

- Build structures with your child using match sticks and a description.

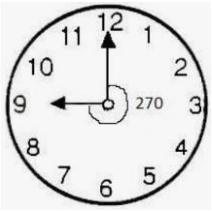





- Allow your child to pack the refrigerator/cupboard/laundry – builds his/her spatial ability and the child gains a sense of volume and capacity in a real-world context.
- When travelling together, ask your child to identify objects with the same size and shape.
- Talk about the shapes made when you cut straight through vegetables or fruit. Cross section, uniformity, symmetry.



- Use the hands of the clock to state whether the angles formed are more than or less than a right angle.

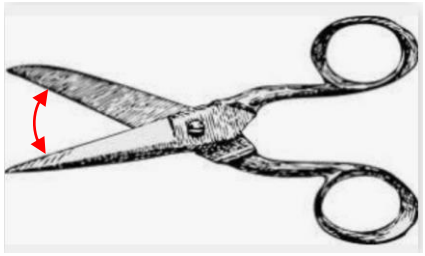


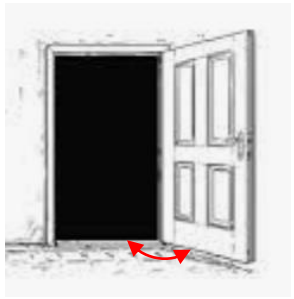


GEOMETRY

- Ask your child to form angles using his/her hands.

- Make shadows on the ground or on a wall using your body or hands and talk about the shapes and angles.
- Assist your child in recognizing and identifying real-world examples of right angles (e.g., the corner of a picture frame).
- Identify angles in everyday objects and ask your child if it is more than or less than a right angle.





MEASUREMENT

- Encourage your child to find the time to do activities such as baking, going to the pharmacy, making a kite, going for a walk.
- Arrange various objects (e.g., books, boxes, and cans) by various size and measurement (e.g., length, weight, and volume) attributes. Talk with your child about how they are arranged using comparison words like “taller,” “shorter,” “narrower,” “wider,” “heaviest,” “lightest,” “more,” “less,” “about,” and “same.”

- Review equivalent names for measurements. For example, “How many millilitres are there in one litre?”
- When cooking or baking, involve your child in determining what the measurements given in grams would be in kilograms (or the reverse).
- When building something, have your child help you discover what the measurements given in centimetres would be in metres.
- Record and compare the height of family members and talk about who is ‘taller' and ‘shorter'

MEASUREMENT

- During trips, have your child convert the number of kilometres travelled to metres.
- When travelling with your child, discuss the best route to take and why.

- When cooking, allow your child to set the kitchen timer.

- Engage your child in working out elapsed time given the start time and end time.
- Allow them to work out possible departure time given the length of the journey and the appointment time.
- Make a game of telling time using the 24-hour clock.

MEASUREMENT

- Draw an analog clock face with the hour and minute hands showing a specific time. Ask your child to record the time shown in different ways.
- Engage your child in activities such as market purchases, grocery shopping and weight loss program.
- Encourage your child to read labels.
- Allow your child to determine the best buy in terms of weight and price.
- Allow your child to use a scale: kitchen, bathroom, luggage.



- Give your child scenarios that will involve reasoning and ask them to help solve the scenario:
  E.g. Wendy was allowed 25kg luggage. Her suitcase was 37.2kg. By how many kilograms was her luggage overweight?

MEASUREMENT

- When shopping, if there is a 10% off sale ask them to work out the new cost of the product and the savings.

- Select five products from a catalogue, then calculate what the cost would be if there was a 50% sale. Does it make a difference if you add up the items, and then deduct 50%, or if each item is reduced by 50% then totalled?

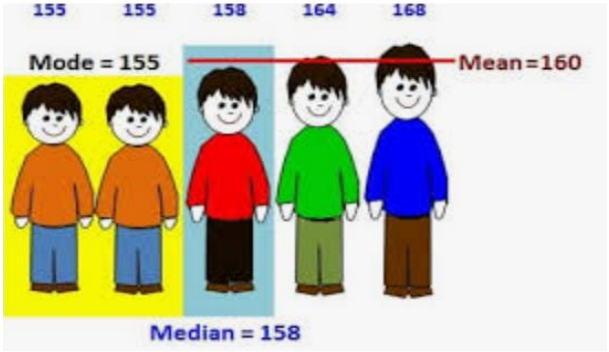
MEASUREMENT

- Encourage your child to save a percentage of their allowance and work out how much this would be. For example, how much money would you have if you saved 30% each week?
- Negotiate increases in pocket money as percentages. For example, a 5% increase on an allowance of $150 per week would be how much money per year? Is this better than a 5% increase on an allowance of $600 per month in one year? Allow them to explain.
- Calculate altogether how much mobile phone services cost per month altogether. What percentage of total cost is spent on data and what percentage on phone calls?
- When supermarket shopping, ask them to keep an estimated running total in their heads of the cost of all the food in the trolley. Turn it into a game and whoever gets the closest to the actual total at the checkouts is the winner.
- Investigate the prices of fresh fruit and vegetables available in the supermarkets compared with market vendors.

- When filling the car up with fuel, tell them the cost per litre and total cost of the fuel and ask them how they would work out how many litres of fuel went into the car.

STATISTICS

- Talk to your child about sharing equally.
- Ask your child to explain the differences between mean, median and mode (at the end of the explanation, you should be clear about what these 3 quantities are).



- Encourage a discussion about having a fruit stall- what fruit would you need to stock most? How would you know? Discuss if a parent wants to know how his/her child is doing in school, would he/she need to know what mark the child scored most often? Or would the average mark be more helpful?
- Open a pack of Skittles or M&M's and make a bar graph showing the number of each colour found inside the pack.

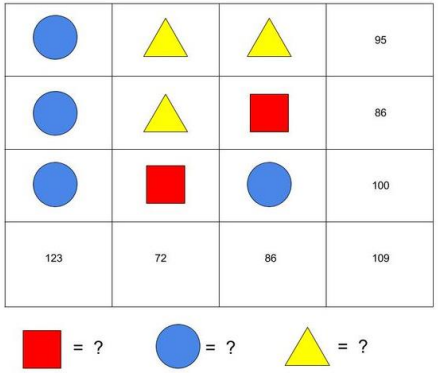
- Monitor the weather report for a week, record the temperatures for each day, and then graph the temperatures.
- Track the scores of games played by your favourite team, then graph them over a period of several weeks.

STATISTICS
• The next time you see a graph in a newspaper on a topic that would interest your child, sit down together and try to interpret it. Work together to answer questions such as, 'What is this graph telling us? How do we know whether the information is true? Is there a different way of representing this information? Is there anything that you don't understand?' • Read information books with your child and discuss tables and graphs that appear in them.

ALGEBRA

- Play a game of “What if “with your child.
  What if I have a number and when 10 is added to it, I get 22. What is my number?
  What if I have a number and when I subtracted 12 from it, I get 22. What is my number?
  What if I have a number and I multiply it by 3 and bet 81. What was my number?
  Encourage your child to make up “what if” questions for you to solve.

- Use fun puzzles to build algebraic thinking skills
- Play mental games to figure out unknown values



SETS, RELATIONS AND FUNCTIONS

- Give your child the task of organising his socks: introduce relations which sock can be paired this sock. Describe what rule they used to match the socks.

Does each sock have a match?

What happens if identical socks appeared more than once on the separate lines? What are all the possible pairs?

APPENDICES

Appendix 1.

ASSIGNMENT TO LEVELS

TOTAL Number of Items per STRAND	LEVELS OF PERFORMANCE defined by NUMBER OF CORRECT ITEMS		
	LEVEL 1	LEVEL 2	LEVEL 3
1	0	1	
2	0	1	2
3	0 - 1	2	3
4	0 - 1	2 - 3	4
5	0 - 1	2 - 3	4 - 5
6	0 - 2	3 - 4	5 - 6
7	0 - 2	3 - 5	6 - 7
8	0 - 2	3 - 6	7 - 8
9	0 - 3	4 - 6	7 - 9
10	0 - 3	4 - 7	8 - 10
11	0 - 3	4 - 8	9 - 11
12	0 - 4	5 - 8	9 - 12
13	0 - 4	5 - 9	10 - 13
14	0 - 4	5 - 9	10 - 14
15	0 - 5	6 - 10	11 -15

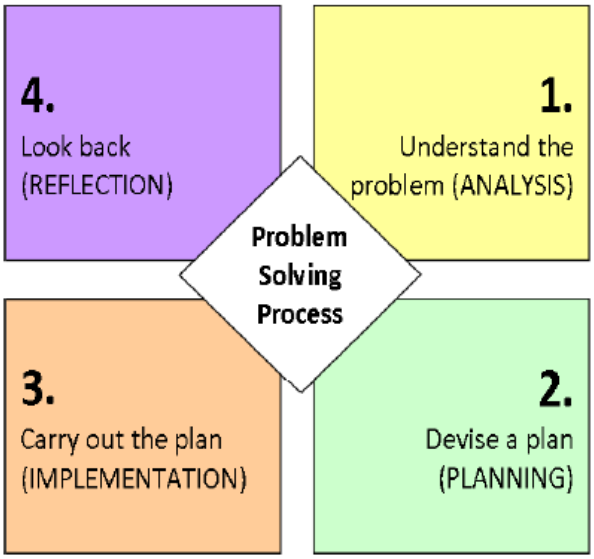
Appendix 2.

Polya's 4-Step Approach to Problem Solving:

Using Polya's 4-Step Approach to Problem Solving:

Step 1. – ANALYSIS – Understand the problem
I must answer these questions:-

- What am I being asked?
- What important information was I given?
- What key words are there?



Step 2. – PLANNING – Devise a plan
What problem solving strategy can I use?

- Draw a Picture
- Act it out
- Use a model
- Look for a Pattern
- Guess and Check
- Work backward
- Make a table or chart
- Simpler form of the problem
- Make an organised list
- Write an equation

Step 3. – IMPLEMENTATION – Carry out the plan
To solve the problem I must:-

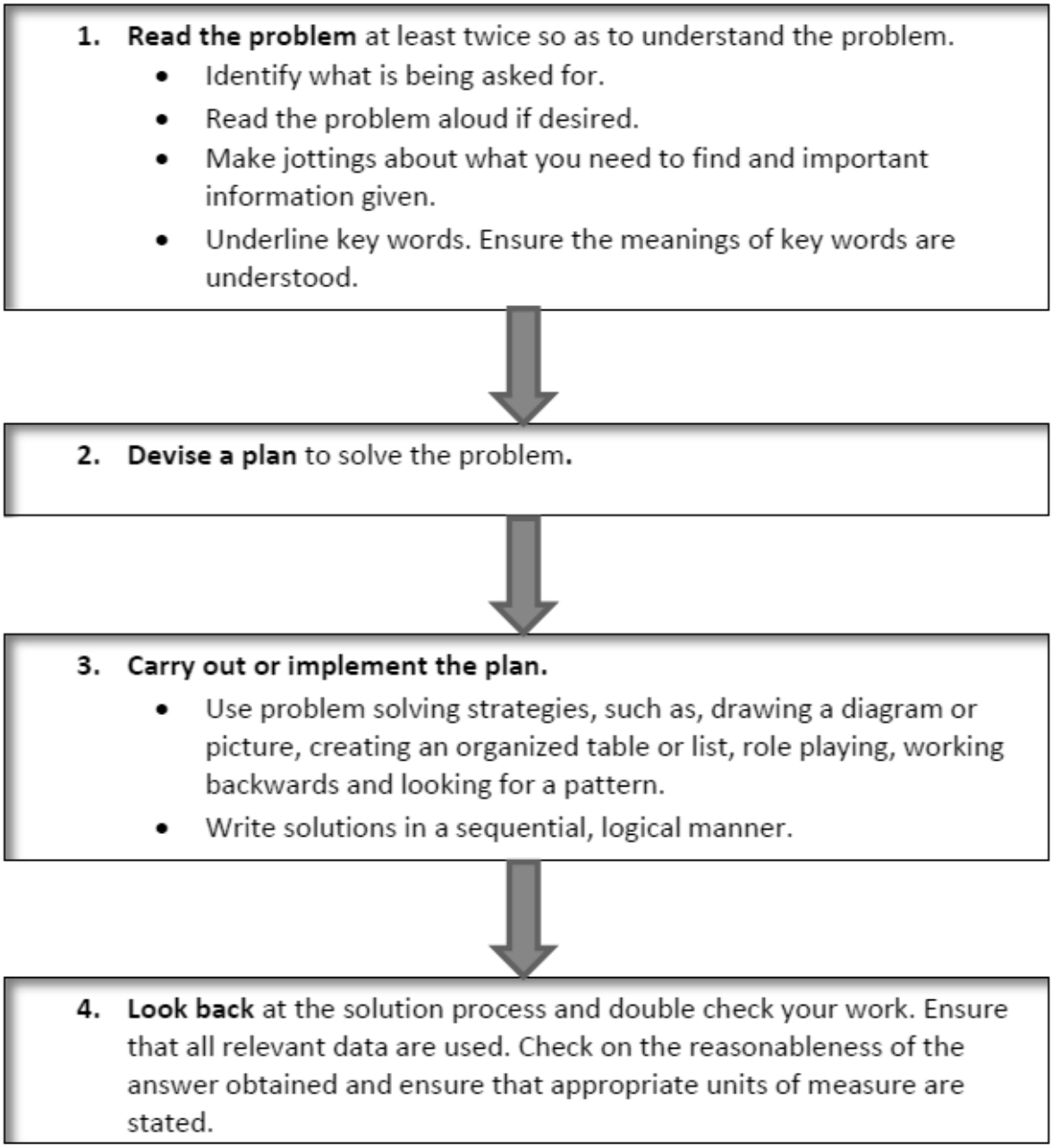
- Apply the strategy chosen
- Obtain a solution
- Write the solution in a sequential, logical manner
- If no solution is obtained, repeat steps 1 to 3

Step 4. – REFLECTION – Looking back / Review the solution:
In reflecting, I will:-

- Look back at the solution process and double check my work
- Ensure that all relevant data are used
- Check on the reasonableness of the answer obtained
- Try an alternative approach

Appendix 3.

George Polya's Four-Step Problem Solving Strategy



Appendix 4.

Problem Solving Strategies

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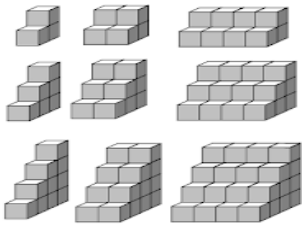
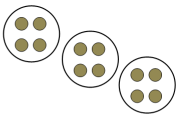
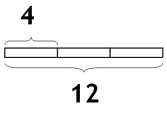
  </td>
<td>Try a Simpler Problem
<s>600 + 300 = ?</s>
6 + 3 = 9
600 + 300 = 900</td>
<td>Make a Model
3 × 4 = 12
 
 
 
4
12</td>
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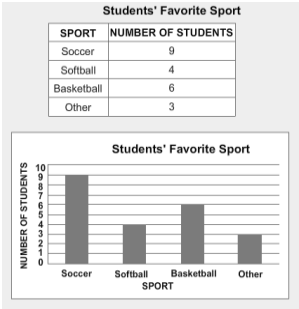
<tr>
<td>Guess and Check
  </td>
<td>Make a List, Graph or Chart
 
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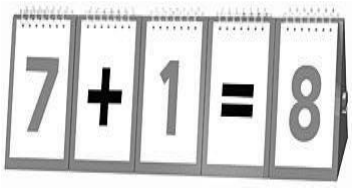
<td>Create a Number Sentence
 
</td>
</tr>
<tr>
<td>Work Backwards
  </td>
<td>Use Reasoning
  </td>
<td>Act it Out
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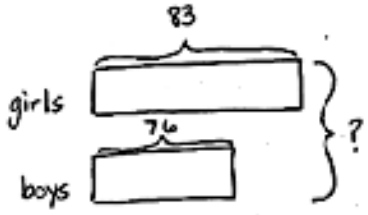
<tr>
<td>Draw a Picture
 
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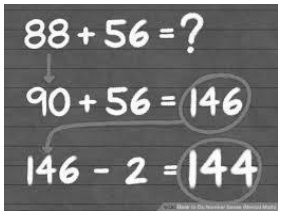
<td>Use Mental Math
 
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<td>Use your Fingers
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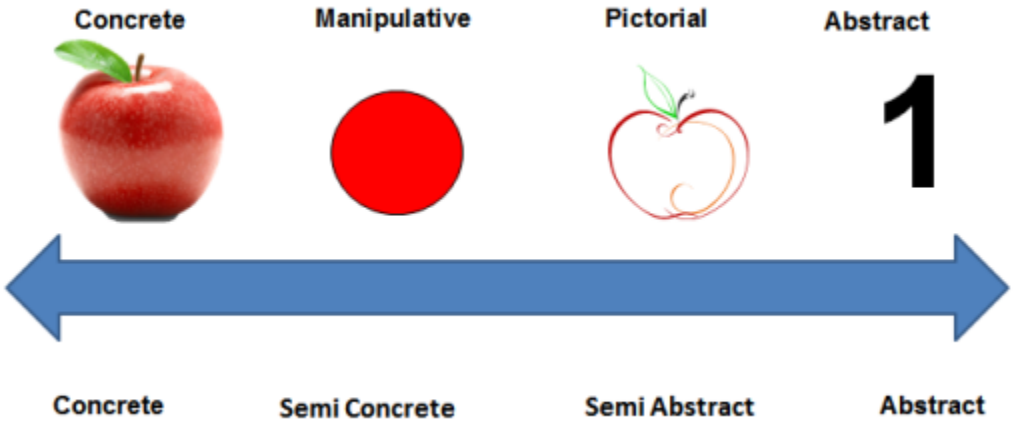
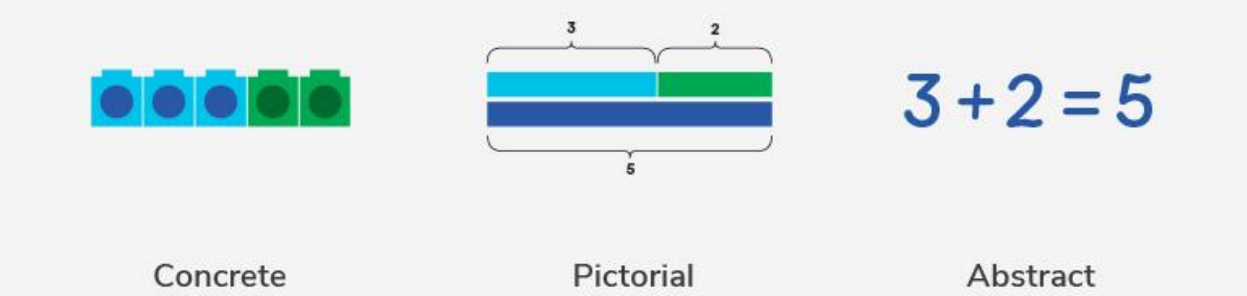
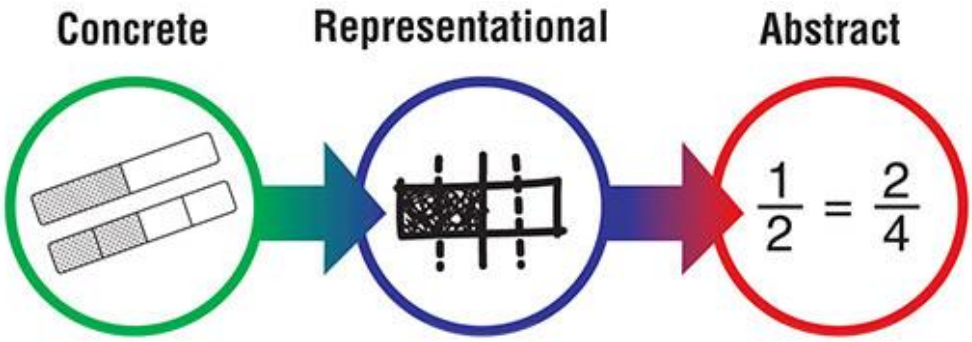
Appendix 5.

Concrete-Pictorial-Abstract Models







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Locke, Sandra Kay, "The effects of the RIDE strategy on teaching word problem solving skills to students with learning disabilities" (2016). Theses and Dissertations. 1485. https://rdw.rowan.edu/etd/1485

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