Shuqun Primary

To Serve with Quality

MATHEMATICS
PRIMARY FOUR

2025

Primary 4 Mathematics Handbook

Overview of Mathematics Curriculum

Mathematics provides the foundation for many aspects of our everyday activities. In primary school, the students need mathematical concepts to make sense of information around them, such as counting objects and money, reading time, seeing shapes and patterns around them.

At this stage, the students also acquire important basic numeracy as well as develop logical reasoning and problem-solving skills that are required in many disciplines. For these reasons, the Primary Mathematics Syllabus aims to enable all students to:

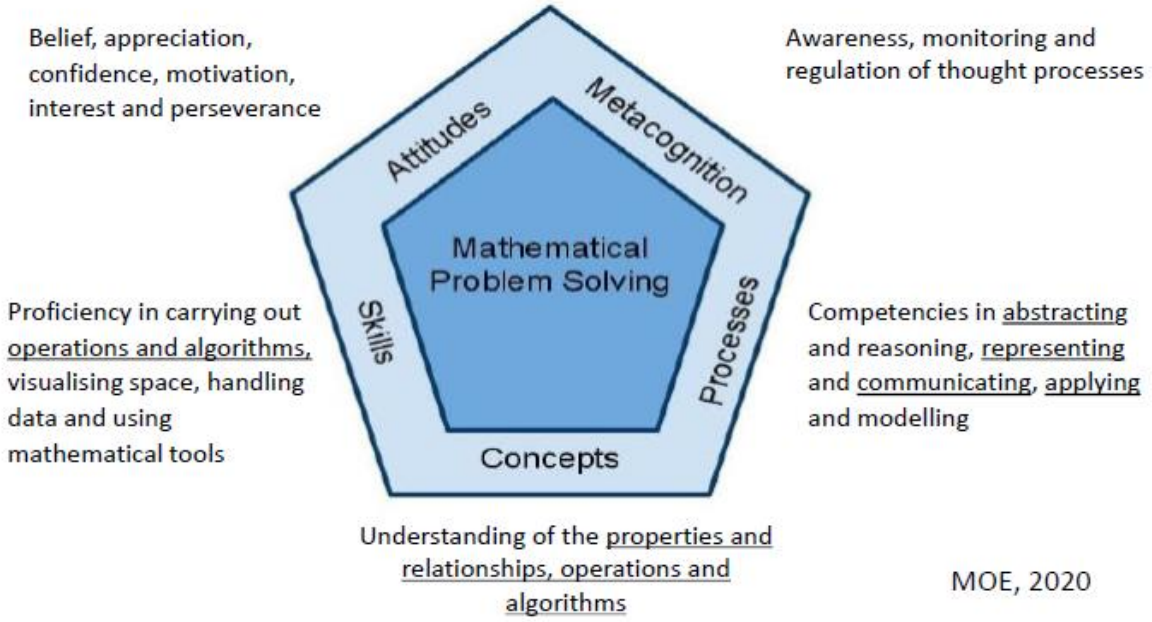
- acquire mathematical concepts and skills for everyday use
- develop thinking, reasoning, communication, application and metacognitive skills through a mathematical approach to problem solving
- build confidence and foster interest in mathematics.

The central focus of the mathematics curriculum is the development of mathematical problem-solving competency. Problems may come from everyday context. They include straightforward and routine task that require selection of the appropriate concepts and skills, as well as complex and non-routine tasks that requires logical reasoning and creative thinking.

Mathematics Curriculum Framework

The Mathematics framework shows the underlying principles of an effective mathematics programme. It sets the direction for the teaching, learning, and assessment of mathematics.

The development of mathematical problem-solving ability is dependent on five interrelated components, namely, Concepts, Skills, Processes, Attitudes and Metacognition.



The understanding of mathematical concepts are essential for solving problems. In the primary mathematics curriculum, concept in numbers, algebra, measurement, geometry and statistics are explored.

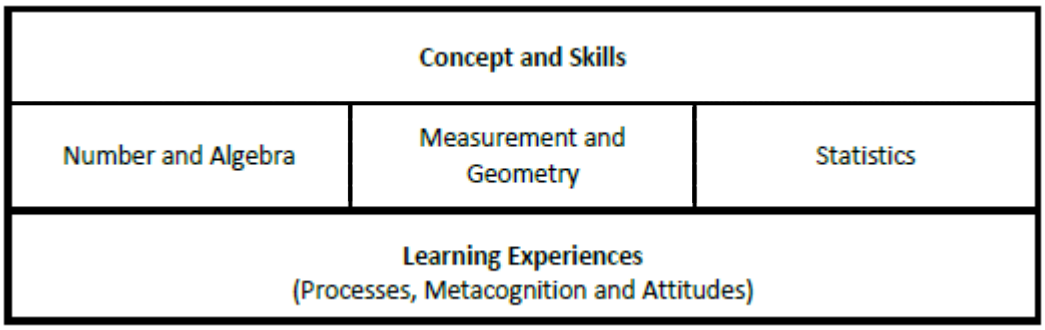
Mathematical processes refer to the practices of mathematicians that are important to solve problems and build new knowledge. This include abstracting, reasoning, representing and communicating. Justifying a result, deriving new results and generalising patterns involve reasoning. Expressing one's ideas, solutions and arguments involves representing and communicating.

Metacognition, or thinking about thinking, refers to the awareness of, and the ability to control one's thinking processes, in particular the selection and use of problem solving strategies. It includes monitoring and awareness of one's affective responses towards a problem.

Mathematics Syllabus

The teaching of Mathematics in Singapore primary school uses the spiral curriculum. This means that many of the topics that have been taught in the lower primary, such as whole numbers, fractions and measurement will be introduced again in both middle and upper primary at a higher level of complexity. This progression allows the students to grasp Mathematical concepts that are appropriate to their age. It is therefore important for the students to be grounded in such foundation concepts.

The syllabus is organised along 3 content strands. The development of processes, metacognition and attitudes are embedded in the learning experiences that are associated with the content.



Besides developing conceptual understanding, the learning experiences provide opportunities for students to:

- enhance conceptual understanding
- apply concepts and skills learnt to solve problems in real-world contexts
- communicate their mathematical reasoning
- build confidence and foster interest in mathematics

Primary 4 students will learn the following:

STRAND: NUMBER AND ALGEBRA	**STRAND : MEASUREMENT AND GEOMETRY**	**STRAND: STATISTICS**
SUB-STRAND 1: WHOLE NUMBERS	**SUB-STRAND 1: GEOMETRY**	**SUB-STRAND 1: DATA REPRESENTATION AND INTERPRETATION**
Numbers up to 100 000 • number notation, representations and place values (ten thousands, thousands, hundreds, tens, ones) • reading and writing numbers in numerals and in words • comparing and ordering numbers • patterns in number sequences • rounding numbers to the nearest 10, 100 or 1000 • use of ≈ **Factors and Multiples** • factors, multiples and their relationship • determining if a 1-digit number is a factor of a given number within 100 • finding the common factors of two given numbers • determining if a number is a multiple of a given 1-digit number • finding the common multiples of two given 1-digit Numbers	**Angles** • using notation such as • ∠ABC and ∠*a* to name angles • measuring angles in degrees • drawing an angle of given size • relating quarter, half and complete turns to angles in degrees • 8-point compass **Rectangle and Square** • properties of rectangle and square, excluding diagonal properties • drawing rectangle and square on square grid **Line symmetry** • identifying symmetric figures • determining whether a straight line is a line of symmetry of a symmetric figure • completing a symmetric figure with respect to a given line of symmetry on square grid	**Table and Line Graphs** • completing a table from given data • reading and interpreting data from tables/line graphs **Pie Charts** • reading and interpreting data from pie charts.

STRAND: NUMBER AND ALGEBRA	STRAND : MEASUREMENT AND GEOMETRY	STRAND: STATISTICS

Four operations
• multiplication algorithm
  ○ up to 4 digits by 1 digit
  ○ up to 3 digits by 2 digits
• division algorithm (up to 4 digits by 1 digit)
• solving up to 3-step word problems involving the 4 operations
	Nets
	• Identifying 2D representations of
	  ○ cube
	  ○ cuboid
	  ○ cone
	  ○ cyclinder
	  ○ prism
	  ○ pyramid
	• Drawing 2D representations of
	  ○ cube
	  ○ cuboid
	  ○ prism
	  ○ pyramid
	• Identifying the nets of 3D solids
	  ○ cube
	  ○ cuboid
	  ○ prism
	  ○ pyramid
	• Identifying the solid which can be formed by the given net	

STRAND: NUMBER AND ALGEBRA	STRAND : MEASUREMENT AND GEOMETRY	STRAND: STATISTICS
SUB-STRAND 2: FRACTIONS	**SUB-STRAND 2: AREA AND VOLUME**	
Mixed numbers and Improper fractions • mixed numbers, improper fractions and their relationships **Fraction of a set of objects** • fraction as part of a set of objects **Addition and Subtraction** • adding and subtracting fractions with denominators of given fractions not exceeding 12 and not more than two different denominators • solving up to 2-step word problems involving addition and subtraction	**Area and Perimeter** • finding one dimension of a rectangle given the other dimension and its area/perimeter • finding the length of one side of a square given its area/perimeter • finding the area of figures made up of rectangles and squares	

STRAND: NUMBER AND ALGEBRA	STRAND : MEASUREMENT AND GEOMETRY	STRAND: STATISTICS
SUB-STRAND 3: DECIMALS	**SUB-STRAND 3: MEASUREMENT**	

Decimals up to 3 decimals places
• notation, representations, and place values (tenths, hundredths, thousandths)
• comparing and ordering decimals
• dividing a whole number by a whole number with quotient as a decimal
• converting decimals to fractions
• converting fractions to decimals when the denominator is a factor of 10 or 100
• rounding decimals to
  o the nearest whole number
  o 1 decimal place
  o 2 decimal places
 	
Addition and Subtraction
• adding and subtracting decimals (up to 2 decimal places)
 	
Multiplication and Division
• multiplying and dividing decimals (up to 2 decimal places) by a 1-digit whole number
• solving up to 2-step word problems involving the 4 operations
• rounding answers to a specified degree of accuracy		

Mathematical Processes

Mathematical processes refer to the process skills involved in the process of acquiring and applying mathematical knowledge. This includes:

- Reasoning, communication and connection
- Application
- Thinking skills and heuristics

The table below describe some of the indicators related to each

Mathematical Processes	Indicators

Reasoning, Communication and Connection	• Use appropriate notations and symbols to present and communicate mathematical ideas
	• Reason by:
	  • Observing patterns, similarities and differences
	  • Drawing logical conclusion and making inferences
	  • Explaining or justifying solutions
	• Make connections within mathematics and between mathematics and everyday life

Application	• Apply mathematical concepts and skills to solve problems in a variety of contexts within or outside mathematics, including:
	  • Identifying the appropriate mathematical representation for a problem
	  • Using appropriate mathematical concepts and skills to solve a problem
	  • Interpreting the mathematical solution in the context of the problem and making sense of the solution

Thinking skills and heuristics	• Use thinking skills such as: comparing, sequencing, and deduction
	• Use a problem-solving model
	• Use heuristics such as:
	  • Drawing a diagram
	  • Making a list
	  • Guess and check
	  • Working backwards

Mathematics Curriculum at SQPS

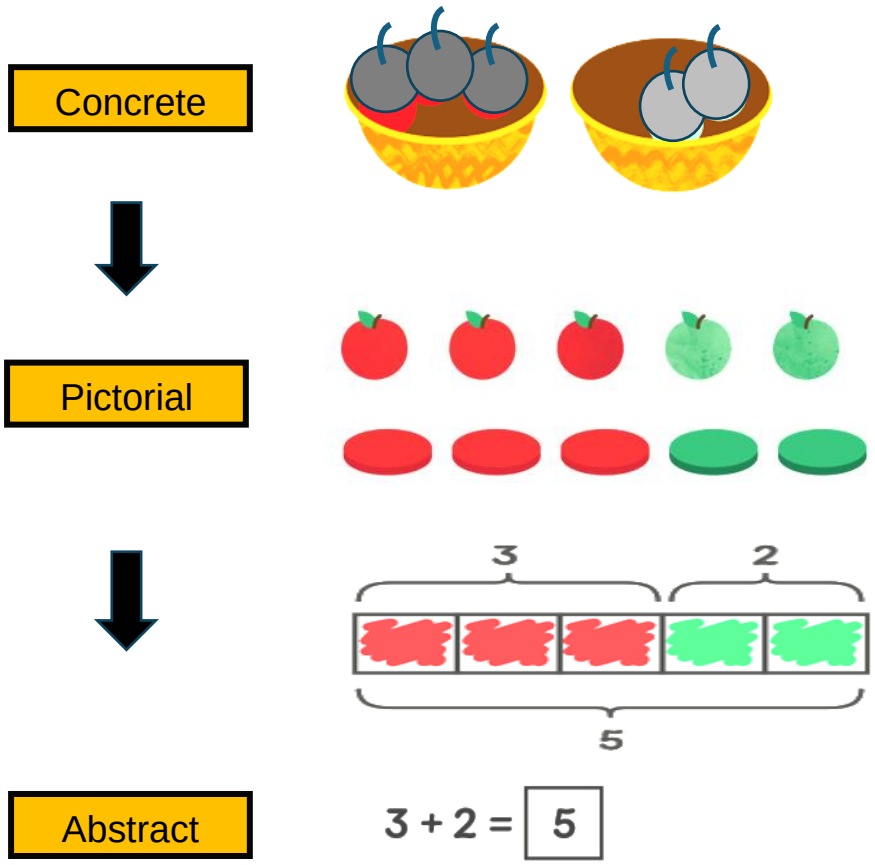
1. Teaching Approaches

Math lessons are delivered using the Concrete-Pictorial-Abstract (C-P-A) approach. To introduce a Mathematical concept, teachers use manipulatives to provide hands-on learning experiences. This age-appropriate approach also provide scaffolding for the primary students to help them grasp abstract mathematical concepts.

The concrete manipulatives will be followed by pictorial representations. Finally, the students will move on to the abstract representation in the form of mathematical symbols and equations.

Example:

There are 3 red apples and 2 green apples. How many apples are there altogether?



To help the students visualise abstract mathematical concepts involving the 4 operations (addition, subtraction, multiplication and division), the students in the lower primary will be progressively introduced to model drawing skills. This foundational skill will help the students to comprehend and translate a mathematical problem to a simpler pictorial representation. In addition, the skills will also be very useful when the students learn more complex mathematical problems in the middle and upper primary.

2. Topical Worksheet and Heuristic Skills

To supplement the workbook practices, students are given school topical worksheets. This will provide reinforcement of concepts and skills learnt at the end of each topic.

In addition, the students also learn thinking skills (heuristics) to train and equip them with different problem-solving strategies required to solve more challenging Math problems. These strategies include:

- model drawing
- looking for patterns
- guess and check
- making a list
- working backwards

The various skills will be revisited periodically to provide students with enough repetition for subject mastery.

3. Remediation Class for Mathematics

For the students who have not performed very well during formal assessment, the school supports them with remediation class where they will be coached in a small-group setting. The students are grouped according to their Math results. This will enable the teachers who conduct the remediation class to adjust the pace of the lesson according to the profile of the students.

During remediation class, there will be re-teaching of the concepts that they have learnt in class. Additional written work is also provided to give enough opportunity for the students to practice and learn from their mistakes. In addition, students are expected to have additional revision time at home to ensure retention of important concepts that have been taught in class.

4. High Progress Resources

High progress students will be provided with additional written work to stretch their learning. The questions provided in the resources will give them opportunities to use mathematical thinking and mathematical communication. In addition, these exercises will train them to apply the Mathematical concept that they have learnt in unfamiliar context.

5. Use of ICT

As part of the effort to cultivate self-directed learning, the school make use of Koobits and SLS (Student Learning Space) learning portal to supplement the teaching and learning of Mathematics. Koobits platform allows the students to do daily challenge through bite-size Math quizzes and games. This will help improve the students' basic numeracy skills by providing immediate feedback to the student's response. In addition, the SLS portal is used by the teachers to assign ICT lessons that will reinforce the concepts that have been taught in class.

6. Math Activities Outside Classroom

To increase students' interest in learning Mathematics, the school uses its broadcast system and notice boards to engage students with Math quizzes and puzzles. The puzzles and displays will create awareness of Mathematics application beyond the classroom learning.

The students are also invited to participate in Mathematics projects such as Math trails and poster design. Student's submissions will be evaluated and prizes will be given for the best work. In addition, selected student's work will be put up for display along school common area to increase the vibrancy of learning.

Mathematical Problem Solving Approach

To equip students with better problem solving skills, the school make a deliberate effort to teach Mathematical process skills through problem solving. The students are taught a systematic problem solving model called STAR approach.

How do you do solve Mathematics problem sum?

- **S**tudy the problem carefully
- **T**hink of a strategy
- **A**ct on the solution
- **R**eflect on the final answer

STAR approach in Math Problem solving

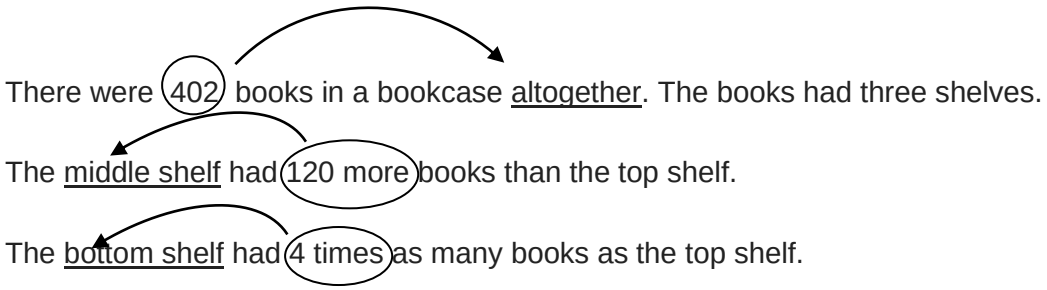
Study	What am I given? *(annotate objects and values, show connections)*
	What am I asked to find?
Think	What strategy should I use?
	Can I use model or diagram/table?
Act	I will apply the strategy.
	I write out my steps and equations.
Reflect	Have I answered the question?
	Does my answer make sense (reasonable)?
	Have I checked for Number Transfer, Unit, Calculation?
	Can I solve it differently?

During Math lessons, teachers will 'think aloud' to give attention to these processes and make them visible to students. Through practice, students will develop habits and strategies to help them be better and more independent learners.

Example of problem solving using STAR approach:

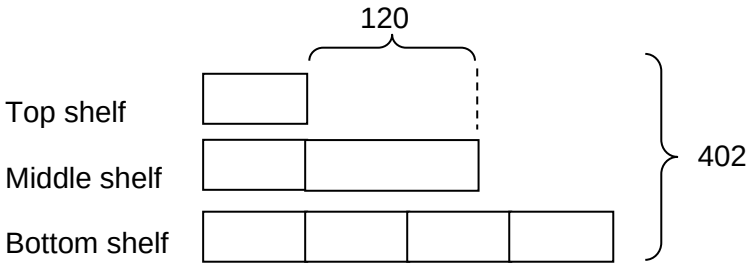
Study: annotation strategy

*note: for clarity of annotation process, students are advised to use a pen or pencil instead of highlighter.



How many books were there on the bottom shelf?

Think: model drawing



Act: equation and working

402 – 120 = 282

6 units = 282
1 unit = 282 ÷ 6 = 47
4 units = 4 x 47 = 188

$$\begin{array}{r} 402 \\ -\ 120 \\ \hline 282 \end{array} \qquad \begin{array}{r} 47 \\ \times\ 4 \\ \hline 188 \end{array}$$

$$6\overline{)282} \quad 47,\ 24,\ 42,\ 42,\ 0$$

Reflect: check for number transfer, unit and calculation

There were 188 books on the bottom shelf.

Other strategies in Mathematical problem solving.

1. Guess and Check

There is a total of 14 cars and motorcycles in a car park.
There are 46 wheels altogether.
How many cars are there in the car park?

Solution:

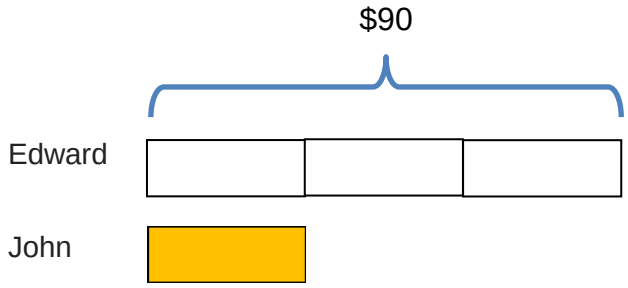
Number of cars	Number of wheels	Number of motorcycles	Number of wheels	Total number of wheels	check
7	7 x 4 = 28	7	7 x 2 = 14	28 + 14 = 42	×
8	8 x 4 = 32	6	6 x 2 = 12	32 + 12 = 44	×
9	9 x 4 = 36	5	5 x 2 = 10	36 + 10 = 46	✓

There are **9** cars in the car park.

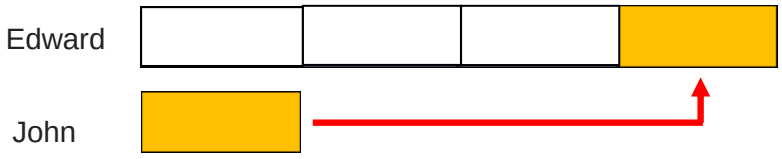
2. Working Backwards

John had no money. Edward gave him some money. Edward then had 3 times as much money as John. Edward spent $35 on a shirt and $55 on shoes and had no money left. How much money does Edward have at first?

35 + 55 = 90
Edward spent $90 altogether.



3 units = 90
1 unit = 90 ÷ 3
= 30



4 units = 30 × 4
= 120

Edward had **$120** at first.

Expectation of Students

1. Students are expected to complete all the work assigned by the subject teachers neatly. This will provide opportunities for students to revise and evaluate the learning that has taken place during lessons. This will also provide feedback to their teachers on the misconceptions that need to be addressed pertaining to the topic.

2. To enable students to do Math with speed and accuracy, certain Math facts can be committed to memory. E.g. multiplication tables can be memorised. Having math facts fluency allows students to recall the basic facts in all four operations accurately, quickly and effortlessly. When students achieve automaticity with these facts, they have attained a level of mastery that enables them to retrieve them from long-term memory without conscious effort or attention. Through automaticity, students free up their working memory and can devote it to problem solving and learning new concepts and skills.

   Fluent math facts also mean less confusion. When a child masters his/her math facts, these concepts will be significantly easier and the student will be better equipped to solve them faster. If the child spends a lot of time doing the basic facts, he/she is more likely to be confused with the processes and get lost in their problem solving calculations.

3. To do well in Mathematics, students are trained to present their Math solutions in a clear and systematic way. In general, students are expected to show the following in their Math presentation:
   - Annotation of key information
   - Model drawing (when relevant)
   - Math equation
   - Math working / calculation
   - Word statement

Assessment

To ascertain students' progress in learning, students will sit for a formal assessment at the end of the year. Prior to the conduct of the examinations, the school will provide practice paper based on previous year's assessment. This will help the students build the rigour required to do well during the examination.

The following tables show the P4 end-of-year examination format.

Booklet	Item type	No. of questions	Mark per question	Weighting
A	MCQ (Multiple Choice)	15	2m	30%
B	SAQ (Short-Answer)	22	2m	44%
	LAQ (Long-Answer)	8	3m, 4m	26%

In addition, the teachers will conduct termly assessment periodically to evaluate student's understanding of the topics taught. This will help both the teachers and students to identify learning gaps and address any misconceptions.

	Term 1	Term 2	Term 3	Term 4
Mode of assessment	WA1	WA2	WA3	End-of-year examination
Weighting	15%	15%	15%	55%
Topics	- Numbers to 100 000 - Factors and Multiples - Four operations of whole Numbers	- Angles - Tables and Line Graph - Fraction (I) & (II) - Whole Numbers (revision)	- Decimals - Four Operations of Decimals - Pie Charts - Squares and Rectangles - Whole Numbers (revision)	All Primary 4 topics

Common mistakes made by students

- Incorrect unit of measurement during conversion

  Example: 1 km = 100 m (*wrong fact*)

- Writing incorrect Math equation

  Example: $\underbrace{20 + 10}$ = 30 + 5 = $\underbrace{35}$

  Not equal

- Wrong use of equal sign

  Example: Ben spent $\frac{3}{5}$ of his money. He is left with $12.

  $1 - \frac{3}{5} = \frac{2}{5}$

  $\frac{2}{5}$ = $12 (*wrong equation*) ---------- ($\frac{2}{5}$ is equal to 0.4, not 12)

  It should be written as $\frac{2}{5}$ ---- 12

  or $\frac{2}{5} \rightarrow 12$

  ($\frac{2}{5}$ represents 12)

How to do well in Mathematics

Before exam:

- Revise all the topics in the textbook (from P1-P4).
- Get the basic facts and concepts right.
- Build time management skills, e.g. attempt questions within the exam time limit during practice. Speed and accuracy is important.
- Practise different strategies to solve questions, such as Model Drawing, Making a List.

During exam:

- Highlight important information or data in the questions.
- Use appropriate strategies to solve questions, such as Model Drawing
- Do not dwell too long on a question. Skip questions that you are unsure of and come back to attempt them later.
- Attempt all questions. Show all the Math equations and workings.
- Check all the working and equations.

How Parents Can Support the Child's Learning at Home

Parents are important partners in ensuring a child's mathematical success. A warm, inviting numeracy rich learning environment at home is the first step to fostering a love of mathematics in children. The following are some strategies and opportunities to encourage and sustain math learning in the home:

- ✓ Parents as models of mathematical learning
  - Engage your child in interesting mathematical activities helps stimulate a lifelong enjoyment of mathematics.
  - Build your child's self-confidence and optimism, and help them see math learning as valuable as well as fun.
  - Set a positive mindset for the mathematics learning that takes place at school. Parents cannot replace the school experience, but they are a significant influence on their children's developing attitudes towards, and enjoyment of, mathematics.

- ✓ Have a growth mindset
  - Believe that every child can be successful in math. Encouragement and practice will help.
  - Encourage persistence. (Some math problems take time to solve) It is alright if your child does not get it right at the first attempt or takes a longer time to figure out the math problem.
  - Encourage your child to experiment with different approaches to mathematics. There is often more than one way to solve a math problem.

- ✓ Promote mathematical reasoning
  - Encourage your child to talk about and show a math problem in a way that makes sense (i.e., draw a picture, explain using concrete objects, etc)
  - When your child is solving math problems ask questions such as:
    - What operation do you use? Why?
    - Do you see any patterns?
    - Does the answer make sense? How do you know?

- ✓ Connect math to everyday life and help your child understand how math influences them (i.e. shapes of traffic signs, walking distance to school, telling time, weighing and reading mass of objects).

- ✓ Use of Games and Storybooks to practise Mathematical concepts

- ✓ Use of ICT resources effectively
  The following websites can be explored to introduce math concepts through fun activities.
  - https://member.koobits.com/
  - https://www.mathplayground.com/