



MPM math & its relevance to MOE syllabus

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Agenda

- ▶ Singapore Mathematics Curriculum
- ▶ Mathematics Framework
- ▶ Heuristics – Problem Solving Skills
- ▶ Suggestions

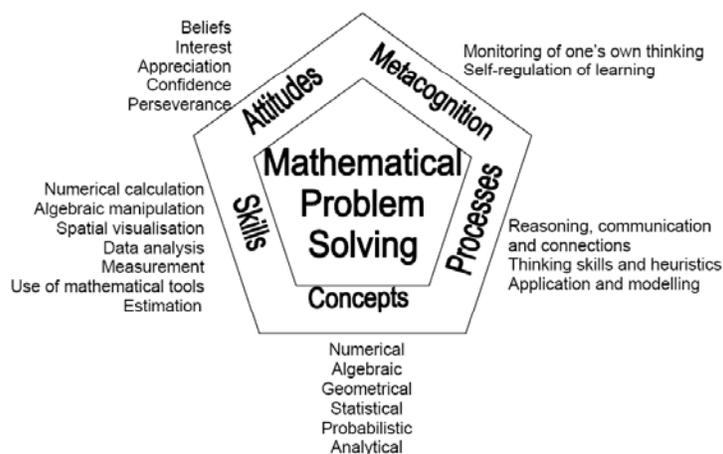


Singapore Mathematics Curriculum

- ▶ Singapore mathematics curriculum
 - Problem solving
 - Development and improvement of a person's intellectual competence
 - logical reasoning
 - spatial visualization
 - analysis and abstract thought
 - De-emphasize procedural skills
 - Emphasize qualities that are essential to be a good thinker



Mathematics Framework



Introduction to Heuristics

What are heuristics?

- Problem-Solving Strategies / Skills



Why do we teach heuristics?

- To help pupils handle higher level problem solving by unconventional ways



Introduction to Heuristic

Problem solving is described in a 6-phased process

1. Read
2. Comprehend
3. Know the Strategies
4. Transform
5. Computation
6. Fit into the given Situation

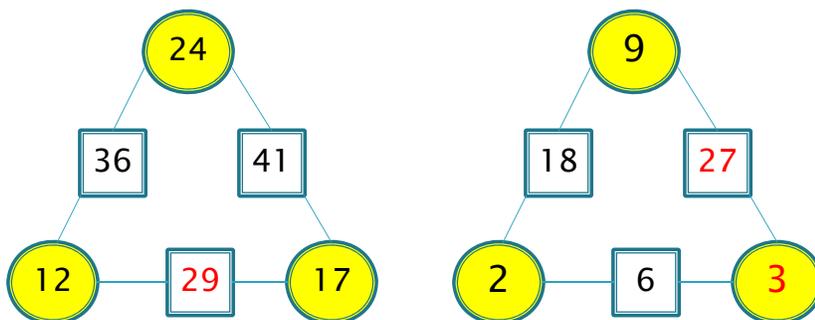


Different type of Heuristics

- ❖ Pictorial Approach
- ❖ Look for a Pattern
- ❖ Make a Table or List
- ❖ Logical Reasoning
- ❖ Guess and Check



Activity 1



Develops the ability to **look for patterns**
as the children practice the skill of addition & multiplication.



Activity 2

Find the sum of the following:

$$1 + 2 + 3 + 4 + \dots + 96 + 97 + 98 + 99$$

- ▶ Do you use calculators?
- ▶ Or formulas ?
- ▶ **New Competencies : Patterning**

Solution - Activity 2

$$1 + 2 + 3 + 4 + \dots + 96 + 97 + 98 + 99 = ???$$

$$\dots + 47 + 48 + 49 + \textcircled{50} + 51 + 52 + 53 + \dots$$

100

Stand alone number

Total 99 numbers = 49 pairs + 1 extra no. "50"
 $= (49 \times 100) + 50 = 4950$ (ans)

Develops the ability to **look for patterns** as the children practice the skill of addition.

The activity are based addition, multiplication & division, for Primary 3.

Activity 3

It is given that $27 \times 8 = 216$

What is the value for 28×8 ?

What is the value for 25×8 ?

What is the value for 28×9 ?



Develops **Visualization skill** and the ability **to make connections, to reason and to communicate** their ideas.

This activities are for the topic of multiplication for Primary 2 and 3.

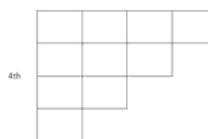
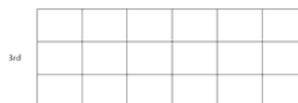
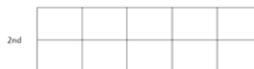


Activity 4

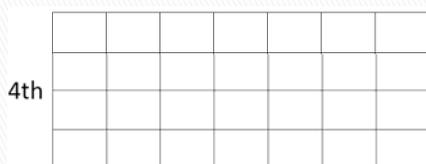
Agnes uses square tiles to make rectangles according to a certain rule

Complete the 4th rectangle that she makes

Which rectangle is made using 70 square tiles?



Solution – Activity 4



Which rectangle is made using 70 square tiles

$$1 \times 4 = 4$$

$$2 \times 5 = 10$$

$$3 \times 6 = 18$$

$$4 \times 7 = 28$$

$$5 \times 8 = 40$$

$$6 \times 9 = 54$$

$$7 \times 10 = 70$$





Ability to **make connections**
between and among seemingly unrelated things.

This requires the person to “see” relationships
– which are invisible.



Activity 5



In a farm, there are cows and ducks. If there
13 heads and 38 legs in all, how many cows
and ducks are there in the farm?

New competencies : Guess & Check method



No. of Cows	No. of Ducks	No. of Legs Cow x 4	No. of Legs Duck x 2	Total no. of Heads	Total no. of Legs	Check
2	11	8	22	13	30	X
4	9	16	18	13	34	X
6	7	24	14	13	38	✓



Activity 6



Solve the Problem sum below:

Siti packs her clothes into a suitcase and it weighs 29kg.

John packs his clothes into an identical suitcase and it weighs 11kg.

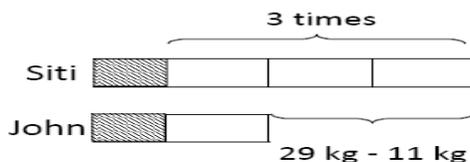
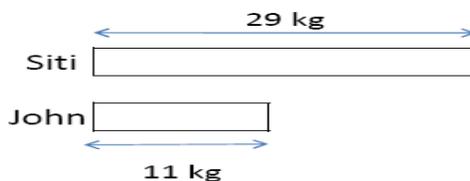
Siti's clothes are three times as heavy as John's clothes.

- What is the mass of John's clothes?
- What is the mass of the suitcase?

New competencies : Model Drawing



Solution – Activity 6



$$2 \text{ u} = 29 \text{ kg} - 11 \text{ kg}$$

$$= 18 \text{ kg}$$

$$1 \text{ u} = 18 \text{ kg} / 2$$

$$= 9 \text{ kg}$$

$$\text{Suitcase} = 11 \text{ kg} - 9 \text{ kg}$$

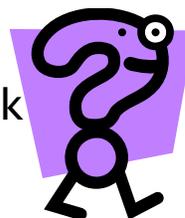
$$= 2 \text{ kg}$$



Summary

In problem solving, pupils must be openly curious about the conditions given and always question their assumption

What question should pupils ask



Suggestions



- ▶ What is the question you trying to answer?
- ▶ Can you divide the questions into sub-questions?
- ▶ What assumption can you make?
- ▶ Have you presented your data accurately and clearly in a relevant manner?
- ▶ What are the alternative explanations that may be possible in solving this question?
- ▶ Are there other reasonable explanations that can be considered? Can you justify them?



Once this becomes a habit, pupils will be able to think **critically** about what they are doing and will not be caught off-guard by unfamiliar or non-routine questions.



A last note

Any method or strategy used to solve the problem will be acceptable as long as it is Logical

Help our children to believe in themselves, that there is greatness in them, and then help them to bring it out.



Questions?



Thank you for
being here
today

