

HOW TO TEACH YOUR CHILD MATHEMATICAL PROBLEM SOLVING?

by Ng Ming Hwei

mathsHeuristics™ is the answer

Primary school mathematics is getting more challenging such that many parents experience difficulty in teaching their children mathematical problem solving skills or heuristics.

What are heuristics? They refer to simple, efficient rules, evolutionary processes or learned methods, and explain how people make decisions and solve problems. An example is drawing a picture to understand a problem.

We speak to Mr Sunny Tan, the principal trainer at mathsHeuristics™ and learn that the mathematics syllabuses developed by the Curriculum Planning and Developing Division (CPDD) have identified 11 heuristics that are applicable to mathematical problem solving at primary school level.

They are 11 heuristics:

1. Use of Diagram / Model
2. Act It Out
3. Before & After Concept
4. Make a Systematic List
5. Look for Pattern
6. Work Backwards
7. Guess & Check
8. Simplify the Problem
9. Make supposition
10. Restate the problem in another way
11. Solve part of the problem

Also, the use of equation in problem solving is not listed in the syllabus. Pupils are also not required to use algebra to solve problems yet many parents tried to teach their child algebra and end up confusing their child.

When it comes to mathematics, problem solving heuristics are therefore special strategies combined with the four basic operations to solve challenging non-routine problems, particularly those in section C of the PSLE Math paper.

Do you know how to teach your child heuristics? If not, mathsHeuristics™ can help.

Mr Sunny Tan embarked on an action research in Dec 2006 on the subject of heuristics to solve challenging math problems. His research found that students, who undergo an intervention programme by getting explicit training in problem solving heuristics, outperform their peers in solving non-routine mathematical problems.

Thus to help children master problem solving heuristics, Mr Tan developed The mathsHeuristics™ curriculum is designed based on Bloom's taxonomy which is a basis of Higher Order Thinking Skills. It states that Higher Order thinking is a complex combination of lower skills and higher level skills.

Lower skills:

- Level 1: Knowledge
- Level 2: Comprehension
- Level 3: Application

Higher level:

- Level 4: Analysis: Break the information into parts
- Level 5: Synthesis: Put back all the information
- Level 6: Evaluate: Judge the outcome

Hence for a child's results to escalate, he or she must be trained to surpass beyond the first three basic levels to the higher levels (Level 4 to 6).

As a mathematics educator, Mr Tan also emphasises a systematic approach to build a child's confidence and motivate them to be effective and confident problem solvers. He believes that the pupils' self esteem are increased when they experience the satisfaction, pleasure, fun and thrill of discovery with problem solving heuristics.

Many students with fantastic improvements in the 2008 PSLE Math are testimonials to his method. E.g. Sharon Yeo, P6 CHIJ student had improved from 52% in SA1 to 99% in Preliminary exam and A* in PSLE within 20 weeks.

In short, mathsHeuristics™ aims to train students the conceptual skills to understand and analyse, synthesize and evaluate problems, and learn the creative problem solving skills not explicitly taught in school and score in the PSLE Math paper.

Mr Tan's new book, "Unit Transfer Method In Solving Challenging Upper Primary Mathematical Problems" will be released at the end of Feb 2009. It is the first of the four titles in the mathsHeuristics™ series publication. In this book, he talks about the simple, logical and powerful technique of Unit Transfer Method, an alternative to the model approach and the algebraic framework. This method provides the problem solving framework to help students analyze problems and use units (ratio) to solve them effectively. This would solve 90% of the challenging problems involving six main PSLE topics, namely whole number, fraction, decimal, percentage, ratio, rate and speed, and is particularly effective in solving complicated speed and rate problems. So keep a lookout for this book.

Visit <http://www.mathsheuristics.com> to learn more about mathsHeuristics™ and how Mr Tan and his team can help your child master mathematical problem solving skills.



About the author

Sunny Tan is an NIE-trained ex-teacher with more than 10 years of teaching experience with the Ministry of Education. He holds a Master of Arts (Mathematical Thinking), Bachelor of Engineering, Advanced Diploma in Education and Diploma in Education. He is currently

acquiring his PhD with a research focus on mathematical problem solving, problem posing and thinking skills.

He started mathsHeuristics™ and specialises in conducting workshops to train students in the application

of heuristics to solve challenging mathematical problems. He also conducts parent workshops on Problem Solving Heuristics. Recently, he spoke at a parents' seminar organised by CDAC on Heuristics Approach in Problem Solving Challenging PSLE Mathematical Problems.