STRATEGIES FOR PROBLEM SOLVING

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TARGET AUDIENCE: Mathematics teachers in the Intermediate & Senior Phases.

DURATION: 2 HOURS

MAXIMUM NUMBERS OF PARTICIPANTS: Unlimited

MOTIVATION

- To enhance teachers' knowledge of ways in which strategies for problem solving can be taught to students through the use of open-ended, non-routine problems.
- To help teachers recognise and source non-routine problems related to patterns and algebra.
- To increase teachers' confidence in conducting whole-class discussions based on sharing students' solutions to problems.

CONTENT

Participants will solve and discuss the role of patterns in the following three problems:

- Matchstick problem – seeing patterns
- Paper folding – explaining patterns
- Regions of a circle – beware of patterns

Participants will also examine links to algebra, as well as discuss the place of problem solving in the curriculum.

HANDOUTS

The Matchstick Problem

Stacey, K. & Groves, S. (1985) *Strategies for Problem Solving*. (Reprinted 2006), pp. 57–58. Berwick, Vic: Objective Learning Materials.

Groves, S. (2013). Strategies for problem solving. In Z. Davis & S. Jaffer (Eds.), *Proceedings of the 19th Annual Congress of the Association for Mathematics Education of South Africa*, Vol. 2. (pp. 27 – 28). Cape Town: AMESA.

PROPOSED TIME ALLOCATION FOR WORKSHOP ACTIVITIES

Activity	Time
Introduction	
• Discussion of relevant aspects of problem solving in the South African mathematics curriculum	10 minutes
• Outline of the session	
Matchstick problem – seeing patterns	
• Solving problem individually or in groups	10 minutes
• Sharing solutions	20 minutes
• Examples of Japanese upper primary students' solutions	5 minutes
• Links to algebra	5 minutes
Paper folding – explaining patterns	
• Solving problem individually or in groups	10 minutes
• Sharing solutions – different patterns need different explanations (justifications)	20 minutes
Regions of a circle – beware of patterns	
• Solving problem individually	10 minutes
• Discussing solutions – need to be able to justify (prove) patterns	10 minutes
Conclusion	
• Using patterns to help solve problems	5 minutes
• Strategies for Problem Solving book	5 minutes
General discussion	10 minutes

ABSTRACT

The South African *National Curriculum Statement* states that it aims to produce learners who are able to identify and solve problems and make decisions using critical and creative thinking and suggests that 10% of time should be devoted to problem solving, where this refers to unseen, non-routine problems. Yet a search for the term problem solving in the content reveals only references to solving problems (mainly calculations) in measurement and fractions. Most of the possibilities for solving non-routine problems, in both the Intermediate and Senior Phases, seem to occur in the content area of *Patterns, functions and algebra.* This workshop focuses on ways in which teachers can develop their students problem solving skills and strategies, particularly in the area of using patterns to help solve problems.