

THE METHODOLOGY OF TEACHING INTERESTING MATHEMATICAL PROBLEMS IN GENERAL EDUCATION SCHOOLS

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Annotation

This article examines the methodology of using interesting problems in teaching mathematics in general education schools and analyzes their role in enhancing students' mathematical thinking, logical reasoning, creativity, and motivation. The paper discusses various types of engaging problems, the criteria for selecting them, and the ways to integrate them into the teaching process. In addition, interactive methods, effective strategies, and practical recommendations for working with such problems are presented.

Keywords: Interesting problems, mathematics, logical reasoning, methodology, motivation, interactive methods, creative thinking.

Introduction

In the teaching of mathematics, interesting problems, puzzles, and tasks with unconventional solutions possess significant didactic value. Such problems enliven the theoretical content of mathematics, activate students' thinking processes, and increase their interest in the subject. Integrating engaging problems into the learning process helps overcome the perception of mathematics as a difficult subject and directs students toward independent inquiry, analysis, comparison, and generalization. The pedagogical value of interesting problems lies in their universal nature: they not only reinforce mathematical concepts but also foster creativity, patience, logical reasoning, and intellectual activity in learners. Therefore, the effective use of such problems in mathematics instruction at general education schools is an important methodological task.

Interesting mathematical problems come in a variety of forms. Logical problems require identifying sequences, conditional thinking, and analytical reasoning, thereby enhancing students' logical abilities. Geometric puzzles involve dividing, arranging,

intersecting, or transforming shapes, which strengthens spatial imagination and geometric thinking. Number theory problems are based on number properties, parity, and divisibility rules, contributing to improved arithmetic awareness. Combinatorial and probability problems develop systematic thinking through processes of selection, arrangement, and ordering. Game theory problems cultivate decision-making skills through tasks such as designing optimal strategies or determining winning moves. Real-life applied problems, drawn from everyday situations, demonstrate the practical application of mathematics in daily life.

Examples of Interesting Problems **Logical problem:** Three friends must divide five apples equally; students must find different methods of distribution.

Geometric puzzle: Find ways to divide a square into three unequal parts.

Number problem: A person's birth year is a three-digit number; the sum of its digits is 15, and the tens digit is 2 more than the units digit. Determine the number.

Methodological Foundations of Teaching Interesting Problems

1. Explanation–Demonstration Method

This method involves the teacher explaining the essence, conditions, and solution pathway of a problem while students observe and analyze. The lesson progresses through the following stages:

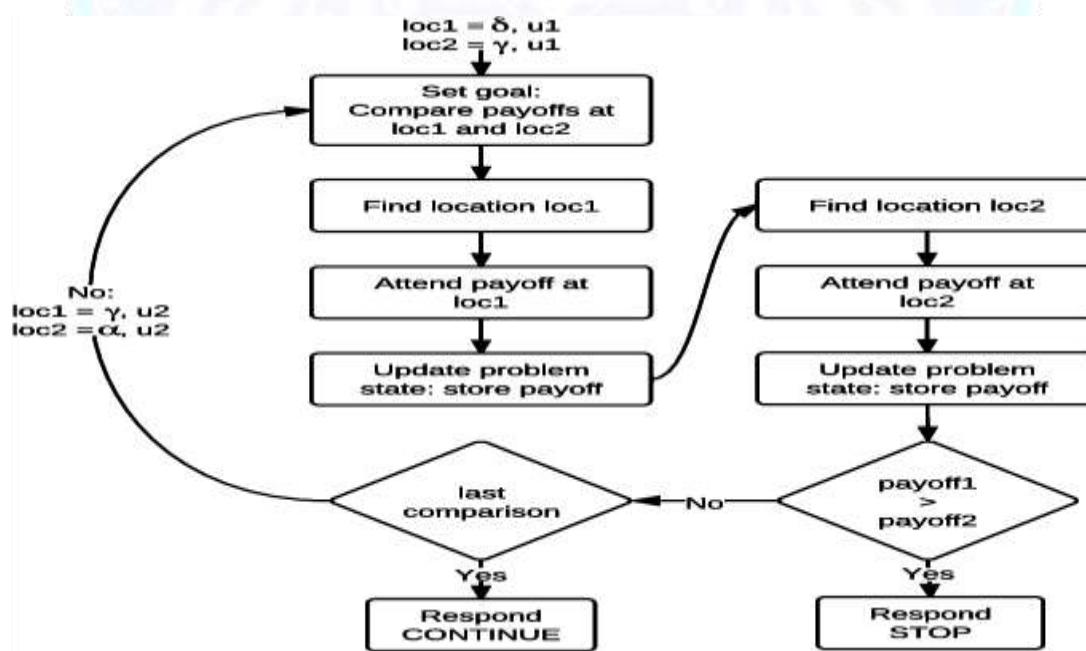
Introduction: the teacher announces the topic and poses an engaging question, and students make predictions;

Explanation: the teacher explains the problem while students take notes;

Demonstration: the solution is presented on the board;

Practice: students independently solve similar types of problems;

Conclusion: solutions are reviewed, and errors are corrected.



2. FSMU Method

The FSMU (Fact–Situation–Meaning–Generalization) method deepens the thinking process step by step. For example, when discussing how the properties of a three-digit number change if its digits are rearranged, students analyze the given fact, consider the situation, present examples, and derive a general conclusion.



3. Cinquain Method

The cinquain method helps express a topic briefly and concisely. A problem may be described using qualities such as interesting and logical, explained with verbs such as think, analyze, solve, and its role in enhancing reasoning emphasized. A synonym such as *puzzle* is used in the final line.

4. T-Chart Method

This method is convenient for illustrating comparisons and branching structures. It develops logical reasoning, visually demonstrates relationships, and increases student engagement. However, in complex problems the diagrams may become overly large, and beginners may find the structure somewhat difficult to follow.

Compare-Contrast T-CHART

Eagles ITEM A	CATEGORIES	Owls ITEM B
<ul style="list-style-type: none"> • hunts during day • eats meat 	Animal behavior	<ul style="list-style-type: none"> • hunts at night • eats meat
<ul style="list-style-type: none"> • razor-sharp talons • sharp beak • small eyes • stiff & smooth feathers 	Physical features	<ul style="list-style-type: none"> • razor-sharp talons • sharp beak • large eyes • soft & fluffy feathers
<ul style="list-style-type: none"> • soars gracefully • flies high 	Movement	<ul style="list-style-type: none"> • doesn't fly high or far • swoops after prey
• national bird of U.S.	Symbol	<ul style="list-style-type: none"> • represents wisdom

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Cinquain: 5 line Poetry

Syllabic verse form. Gradually increasing number of syllables in each line until the last line, which returns to two syllables.

Form for younger students:

Line 1: 2 syllables One word giving the title. (noun)

Line 2: 4 syllables Two words that describe the title. (adjectives)

Line 3: 6 syllables Three words that express action. (Verbs) (End in -ing)

Line 4: 8 syllables Four words that express feeling or describe more.

Line 5: 2 syllables One word that gives the title a different name. (synonym)

Conclusion

Teaching interesting mathematical problems in general education schools plays a crucial role in developing students' logical thinking, imagination, and creativity. Such problems introduce an innovative approach into the traditional teaching process and foster positive motivation toward the subject. Through engaging tasks, students strengthen their skills of analysis, synthesis, comparison, and generalization, gradually becoming capable of solving complex problems independently.

From a methodological perspective, the proper use of interesting problems increases the effectiveness of the lesson, encourages students to be active, and directs them toward inquiry and originality. The teacher's task is to select age-appropriate problems, explain them step by step, and guide learners toward independent thinking. Overall, the methodology of teaching interesting mathematical problems serves as an effective tool for improving the quality of mathematics education, enhancing students' mathematical literacy, and increasing their interest in engaging with the subject.

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