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NON-STANDARD PROBLEMS AS A MECHANISM FOR DEVELOPING STUDENTS' CREATIVE THINKING

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Article history:		Abstract:
Received:	4 th January 2023	This article is dedicated to rais creative capabilite of scool children in teaching
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INTRODUCTION. Young people with intellectual potential are the jewel of the nation, which ensures that our country takes a worthy place in the world community. The future of every country depends on the level of spiritual, moral and intellectual maturity of its youth. Therefore, one of the most important tasks of the education system is to raise a mature generation with high intellectual potential and the ability to quickly find solutions to any practical and theoretical problems encountered in life.

Orientation of education to the personality of the student and achieving the realization of the individual potential of the student in the learning process is the essence of today's education.

In the decisions and programs dedicated to the development of mathematics, special attention is paid to deepening the content of teaching mathematics, strengthening its practical orientation and practical aspects.

ANALYSIS AND RESULTS. When solving the issue of developing creative abilities of schoolchildren in teaching mathematics, one should first know the specific aspects of the development of this science and the creative process in its practical application. Solving the problem of developing creative abilities of modern students helps in many ways to develop their intuition. Therefore, it is useful to develop special issues that provide an opportunity to eliminate certain shortcomings in the educational process. As an example, let's look at two types of creative problems. I. Matters of a training nature

Solve the equations.

1) 2) 3)

Often students find it difficult to solve such equations. The main reason why students fall into this situation is their inability to change the form of the problem from one situation to another, as well as their slowness in solving similar examples. Therefore, we think it would be appropriate to offer the students to solve the following examples.

Example 1. a) b)

v) g) d)

When solving the first equation given above with the students, we will ask the following questions.

Solve the equation "g".

Substitute each of the equations "b" - "d" into the equation "a".

Can the remaining equations be reduced to equation "b"?

Substitute all the equations into the "v" equation.

Substitute all the equations into the "g" equation.

6. Bring all the equations to the "d" equation.

As a result of observation, comparison and solving, students will learn that the equations "a" - "d" differ from each other only in terms of form, and in fact they are expressed in different forms of the first equation. The solution of the equations can be started from the equation "d", in which case the goal-directed observation can be started from any one of them based on a different plan, only the sequence of solving will change. When setting such exercises, the teacher assumes that the students will be able to solve the problem using the heuristic method and form their actions aimed at a specific goal.

II. A search type problem.

Matter. At what values of n is the following equality valid?

(n≥2)

To solve this problem, we divide it into several parts:

1. Calculate the last two multiplications.

2. Calculate the last three multiplications.

3. Compare the results of the last four multiplications.

5. As a result of the comparison, write the result for the case where there are n-1 products.

6. Compare the result with the given number and find "n".

It is also possible to take a different approach when dividing the given problem into parts (small) problems: 1. Calculate the following sequence of multiplications.

a) b)

2. Compare the resulting numbers and find the law of their calculation.

3. Write the result of calculating "n-1" multiplication based on the found law.

4. Put the result into the equation and find "n".

v)

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In the process of solving the problem, a question arises: what is a product with "n-1" multipliers?

Since students are not familiar with the method of mathematical induction, it is necessary to follow a different path. Simplify each multiplication based on the above questions. In this case, it is necessary to pay attention to the fact that when the expression in parentheses is brought to the common denominator, the denominator of each fraction is reduced by the image of the next fraction. In this case, the teacher should give additional information to the students about mutually reducing fractions or to the students, "what fractions when multiplied by each other will have a value equal to one?" may ask By answering the above question, students will have the following results:

2. By comparing the numbers resulting from the continuation of such a sequence, students can easily find the law of interdependence, that is, they can notice that the result of each expression is equal to the inverse of the denominator in the first parenthesis.

3. Summarizing these created relationships, students can write a formula for the multiplication of n-1 multipliers.

4. Putting the obtained result into the given equation, it is determined what value the number "n" will take.

The difference between research and practice problems is that the condition of the research problems shows its form differently compared to the solution algorithm, and the practice problems are reminiscent of the algorithm of their solution when given. Research-type problems can cause more difficulties than practice-type problems, because in practice-type problems, the result is obtained by applying certain formulas to many givens.

One of the activities that create the most opportunities for students to develop their creative abilities is circle activities. First of all, it is possible to support the constant creative activity of schoolchildren in the conditions of circle work. In this case, the initiative in choosing a topic arises only when the interest in studying this topic comes from the students themselves.

The effectiveness of the method of developing students' creative abilities depends on the activity of students and the success of their creative actions.

Students' independent solving of non-standard problems develops their intuition and develops the following creative qualities:

Development of creative and practical activity.

Ability to draw correct scientific conclusions based on conscious creative comparison in various non-standard scientific situations.

Creative thinking about connections between conditions and conclusions in mathematical processes. Ability to solve creative tests.

To understand parameter connections in expressions, formulas, graphs, draw conclusions and be able to change them.

Psychologists say that it is necessary to improve students' creative approach to the problem in teaching mathematics. Otherwise, in the future, it will not be possible to form a knowledge system in the student that will allow him to independently enter the unexplored aspects of science.

If the teacher is not able to make the students interested in the subject, then this subject may become a useless subject for them. The lack of interest in science does not serve to increase the ability to think actively.

CONCLUSION. As can be seen from the above, the system of knowledge imparted to the student should be free and systematic. The main issue is that the mathematics teacher should not impose ready-made templates on the students, and it is not enough to solve the problems with a stereotyped "one correct way", on the contrary, he should see a wide range of creative approaches of the students in each problem. he must admit that he has the opportunity to show.

In the course of the lesson, the teacher should look for factors that hinder the development of students' creative abilities. For this, the teacher should have a comprehensive knowledge of mathematics, pay more attention to non-standard issues during the teaching process, and use all opportunities to properly develop the creative abilities of his students. Including:

- to teach students to correctly define, analyze, compare;

- to explain to students how to express their opinion correctly, fluently and clearly;

- it is necessary to develop students' independent conclusions, reasoning, mental knowledge, skills and abilities.

After all, non-standard problems of this type serve as an important mechanism in the formation of students' knowledge, skills and abilities, creative abilities and qualities, as well as in the conceptual development of mathematics.

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