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STUDY OF SQUARE EQUATIONS IN THE 8TH GRADE USING MODULAR TECHNOLOGY

Abstract. The article gives a description of one embodiment of the modular technology in teaching students math. The analysis of the requirements for learning outcomes, the study objectives and data integration capabilities in the process of the study. Just a list of tasks and issues for study in each of the lessons in both integrated classes, and the framework of the modular study. The question of the use and visualization tools as well as the combination on of this material and other items.

Keywords: multilevel education, educational technology, modular technology, modular training.

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Аннотация. В статье дается характеристика одного из вариантов реализации модульной технологии при обучении школьников математике. Анализ требований к результатам обучения, задачам исследования и возможностям интеграции данных в процессе обучения. Также представляется разработка учебного модуля по изучению неполных квадратных уравнений в 8-м классе.

Ключевые слова: многоуровневое образование, образовательные технологии, модульные технологии, модульное обучение.

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Аңдатпа. Мақалада орта мектеп математикасының модульдік технология жүйесімен оқытудың характерлік сипатамасы мен сабақта қолданысының бір мысалы келтірілген. Және де 8 сынып математикасындағы толық емес квадратты теңдеулер тақырыбының модульді оқыту әдістемесі көрсетілген.

Түйін сөздер: көп деңгейлі білім беру, білім беру технологиялары, модульдік технологиялар, модульдік оқыту.

The reform of the modern secondary school is aimed at creation of pedagogical conditions for the development and self-determination of the student's personality. To achieve this goal, it is necessary to create an adaptive atmosphere based on multi-level learning.

Currently, the information boom has caused the teacher to stop be the main source of knowledge. In connection with this, the nature of his activity is changing: it is not enough just to teach in the traditional sense; in the flow of information, send students to the original sources. Therefore, the traditional explanatory and illustrative process is being replaced by new pedagogical technologies. Although pedagogy today has the richest Arsenal of learning technologies, their effectiveness largely depends on the emotionally positive attitude of students to the material being studied.

Mathematical education contributes to the formation of a common culture man tours. Educational and educational tasks of teaching mathematics should be addressed in a comprehensive manner, taking into account the age characteristics of students, fictions of mathematics as a science and academic subject, defining its role and place in the general system of schooling and education. An important role in the course of high school algebra is played by quadratic equations. Material somehow related to quadratic equations is significant part of the school course of mathematics.

Indeed, quadratic equations not only have an important theoretical value, but also serve purely practical purposes. Overwhelming majority of tasks about spatial forms and quantitative relations of the real world is reduced to solving various types of quadratic equations. Mastering their ways solutions, we find answers to various questions of science and technology (transport, agriculture, industry, communications, etc.). Also for the formation of solving equations is of great importance independent work of the student.

The problem of learning independent work is relevant for teachers all school subjects, including for teachers of mathematics. Its decision is important but also from the point of view that for successful mastering the modern content of school mathematics education it is necessary to increase the efficiency learning process in the direction of enhancing students' independent activities. This requires a clear definition of the system of skills, mastering which leads to the independent performance of works of a different nature.

The problems mentioned above can be successfully solved by using modular technology, which is a collection of various forms and ways of joint activities of teachers and students, as well as independent work of students, organized in special units of the learning process with the goal of maximizing mastery of program material and improving quality education.

The main objectives of the modular learning technology are: comfortable the pace of the student; definition of their capabilities; flexible construction learning content; integration of its various types and forms; formation of learn self-education skills and achieve a high level of final results.

Despite the fairly substantial age of this technology, there are different points of view both on the content of the very concept of "module" and on the approaches to the design of modular programs.

The basic concepts that reveal the essence of modular learning are. The following are: "module", "modular program", complex didactic goal (CDC), integrated didactic goal (IDC), private didactic purpose (PDP), training element (TI), etc.

The module is the main organizational and content unit of the modular learning system, covering educational material that has a relatively independent meaning and includes, as a rule, several topics or sections of the course that are close in content. The module is characterized by such features as integrity, relative independence and logical completeness of its content, flexibility of the structure, speed of control and evaluation of learning outcomes. The module has a specific goal and determines the best ways to achieve it.

The educational element is a part of the educational material reflecting any aspect professional or other tasks. It is the main carrier of educational information and can be primary, supplementary or reference; content - theoretical, practical or mixed.

The main modular learning tool is the modular program (MP). It consists of separate modules.

The preparation of a modular program and separate relevant modules is a time-consuming work requiring great substantive and pedagogical competence.

In the modular program it is necessary to consider:
- purpose of information material;
- a combination of complex, integrating and private goals;
- completeness of educational material in the modules;
- relative independence of the elements of the module;
- implementation of feedback;
- optimal transfer of informational and methodological material.

The modules corresponding to all integrated didactic goals represent a single integrated didactic goal and are combined with a modular program. Each integrated didactic goal consists of particular didactic goals, which in the module corresponds to one element of learning.

We have developed and tested a modular program on the topic "Square Equations", intended for 8th grade students and student's textbook edited by S.

A. Telyakovsky. Classes were held with students School number 9, Omutninsk, Kirov region. The program contains seven modules each of which is implemented in two lessons.

We give a description and content of one of the developed modules (Table 1).

Lesson number 1, 2 “Definition of a quadratic equation. Incomplete quadratic equations. Type of lesson - the study of a new topic.

Integrating goal.

1. To acquaint with a new kind of equations with one variable.
2. To study the method of solving incomplete quadratic equations.
3. Continue work on the development of student speech.
4. Learn to compose an algorithm for solving a task according to a sample.
5. To develop the ability to work with the textbook, to independently acquire knowledge.

The work of students consists of several stages, the so-called learning elements. Each element contains or instructions of the teacher about what you need to know and be able to, or a brief explanation of the assignments, or references to where in the textbook you can find the necessary explanations, as well as a list of tasks. Having read the instructions of the teacher, the student performs independent work, which is included in the training elements, makes conclusions, constructs questions, checks the correctness of the assignments.

At the beginning of the class, an introduction to the learning elements takes place; attention to the fact that students must adhere to a specified amount of time. In the educational element UE-0, students’ attention is fixed on setting the lei classes.

The following training element is aimed at repeating the basic concepts: equation, root of the equation. The second element introduces the concept of square equations, incomplete quadratic equations, types of incomplete quadratic equations. In this case, an instruction is given to independently study the material and discuss it in pairs. If necessary, you can contact the teacher. After performing UE-1 and UE-2 is monitored (talk with students), definitions are pronounced quadratic equation, incomplete quadratic equation, examples are given.

When you perform the next learning element, students disassemble the examples given in the textbook, follow the instructions of the teacher, while working mainly on their own. Further, using them as a model, solve incomplete square the equations. The result of the decision should be the filling of the table (Table 2).

After completing all the learning elements, students are required to complete small independent work (output control), containing 5 tasks (tab. 3).

The last training element of the module involves reflection - an independent assessment of the achievement of the goal of the training element. At the end of the lesson the teacher suggests homework.

Training module

№	***The name of the training element***	***Content, forms, methods (teacher's advice)***
TI -0	Integrating goal: 1. Learn the concepts of a quadratic equation, an incomplete quadratic equation. 2. Obtain methods for solving incomplete quadratic equations. 3. To be able to find the roots of incomplete quadratic equations. 4. Mastering this module will contribute to the development of training skills and skills in independent work with a textbook, the ability to generalize and draw conclusions.	
TI -1	Knowledge update Private didactic goal - to prepare for the study of new material. In the process of working with UE-2 and UE-3, you must: - learn the definitions of a quadratic equation, an incomplete quadratic equation; - learn how to solve incomplete quadratic equations using the examples in the textbook; - be able to solve incomplete quadratic equations in general, select coefficients	1. Complete the sentences. 2. Equality containing a variable is called ... The value of a variable in which the equation becomes a true equality is called ... Solve the equations orally (on the board): $4x=-2$; $5x - 4 =2x+8$; $3x(x+2)=0$; $0,5x^2 =32$
TI-2	A private didactic goal is to	Task 1 ([1], p. 105, p. 19):

(10 min)	study the new material of this topic and begin its primary assimilation.	a) read the definition of a quadratic equation; b) write down the definition in a notebook, give your examples (2–3 square equations); c) tell the definition of each other. Task 2: a) read the definition of an incomplete quadratic equation; b) write the definition in a notebook and give 2–3 of your own examples of incomplete quadratic equations; c) tell the definition to each other; d) write down in general form 3 types of incomplete quadratic equations; e) whether the comments are significant: 1) $c \neq 0$; 2) $b \neq 0$. When you have finished studying the definitions, let the teacher know about the readiness for the conversation. Questions for conversation with the class. 1. Give the definition of a quadratic equation, call coefficients (why $a \neq 0$), give examples. 2. Give a definition of an incomplete quadratic equation, give examples. 3. Write 3 types of incomplete quadratic equations (in general). № 505 (orally) [1]. Specify its coefficients in a quadratic equation: a) $5x^2 - 9x + 4 = 0$;

		5, –9, 4 are the coefficients of the quadratic equation (5 is the first coefficient, –9 is the second, 4 is the free term). Using this example as a model, perform the tasks orally under the letters b – e
TI -3 (15-20 min)	Private didactic goals: - learn how to solve incomplete quadratic equations; - learn how to write the decision correctly	Task 3: 1. Disassemble in the textbook example 1, example 2. 2. Disassemble the solution in the general form of an incomplete quadratic equation of the form $ax^2+c=0$. 3. Does this quadratic equation always have roots? 4. Solve the equation: № 509 a, v, e 5. Prepare to answer at the blackboard (start filling out table 1). Task 4: 1. Disassemble example 3 in the textbook. 2. Disassemble the solution in the general form of incomplete quadratic equations of the form $ax^2+c=0$ и $ax^2=0$. 3. What method is used when solving a quadratic equation of the form $ax^2+bx=0$? 4. Conclude on the number of roots of these two quadratic equations. 5. Solve the equations: № 510 a, в, д; № 511 d, e.

		6. Prepare for the answer at the blackboard (fill in the table). Task 5 If you have completed the tasks from the textbook correctly, then decide from the textbook: № 512 б, г; № 513 b, g, e
TI – 4 (25–30 min)	Private didactic purpose - check the completeness and quality of the material learned	Exercise 1 According to table 1 answer the questions: a) Is an incomplete quadratic equation of the form $ax^2 + c = 0$ has roots? If so, how much? b) How many roots does an incomplete square equation of the form $ax^2 + bx = 0$? Why? c) How many roots have an incomplete quadratic equation of the form? $ax^2 = 0$? Why? The task. d) Perform independently the options for work using table 2. After 15 minutes, hand it over to the teacher
TI -5	*Reflection*	Spend self-control by answering the question: have reached Are you a goal in class? To do this, go back to the beginning of the UE-2 module, to the integrating goal of the lesson
TI -6	*Homework*	Write down your homework: tutorial, p. 19. Learn definitions, a table in a notebook, perform assignments under the numbers № 511 a, b, c, d; № 514 a, c; №. 488; № 496, b, d

Table 2

Card for individual student work

№ n/n	*Equations*	*Conditions for the existence of roots of the equation*	*Roots incomplete square equations*
1	$ax^2+c=0$		
2	$ax^2+bx=0$		
3	$ax^2=0$		

Table 3

Outputcontrol

Option 1	*Option 2*
Solve equations	
1. $-2x^2+18=0$	1. $3x^2+5=0$
2. $36-x^2=0$	2. $25-4x^2=0$
3. $3x^2=12x$	3. $5x^2=10x$
4. 1/3x^2=0	4. $-2,5x^2=0$
5. № 512, а	5. № 512, в

Experienced teaching has shown that the use of modular technology contributes to an increase in the level of knowledge and skills on the topic “Square Equations”.

In this case, students form:

- the ability to set a learning goal and to plan ways to achieve it;
- the ability to evaluate and analyze their activities;
- skills to work with sources of information;
- skills of self-control, mutual control, educational, business communication, self-learning;
- the ability to work in pairs, groups, independently by algorithm and creatively;
- adequate self-assessment of the results of the activity regarding the level of learning material mastering.

Thus, with the systematic use of modular technology of learning, students form and improve the skills of independent learning activities. At the same time, practice has shown that students are not sufficiently prepared and motivated to work independently.

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