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METHODS AND TOOLS FOR IMPLEMENTING INCLUSIVE EDUCATION IN MATHEMATICS LESSONS

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ABSTRACT

This article examines issues at all stages of a lesson in inclusive classrooms, exploring the potential for widespread use of differentiation: organizational stage, motivational stage, knowledge updating stage, goal-setting and lesson planning stage, new knowledge discovery stage, and knowledge assessment stage. The elements of a differentiated approach include creating psychologically comfortable conditions for students and ensuring the individual development of each student.

Key words: *inclusive classrooms, widespread use, differentiation, organizational stage, motivational stage, knowledge updating stage, goal-setting and lesson planning stage, new knowledge discovery stage, knowledge assessment stage, individual development process.*

Teacher techniques and methods are the resources and methods by which a teacher achieves the objectives set in the lesson. The selected methods must be selected and applied competently. The tools must be combined or modified in a way that tracks the students' changing activities and utilizes as many analytical skills as possible: motor skills, memory, vision, hearing, and logical thinking. The specifics of student assessment include: the content of knowledge, the personal nature of the assessment, and psychological characteristics. Therefore, when working in inclusive classes being

formed "today," special attention must be paid to the formulation of assignments, using both written and oral methods. Remember that assignments should be specific and concise, possibly using only one verb, while standing next to the child, giving them the opportunity to complete the activity. Therefore, it is essential to adhere to the existing requirements for organizing lessons in an inclusive class.

The lesson process and its course depend on how the students' topics relate to their various learning needs, how well they mastered the previous topic, and what awaits them in the current lesson (reviewing previous material, assessing knowledge, skills, and abilities, or presenting new material). Consolidation and practice of acquired knowledge, skills, and abilities in mathematics lessons is based on various didactic materials, individually selected for each student (assignments from the textbook, exercises on the board, flashcards, etc.). If all students in a class share a common topic, then the material is studied frontally, and children acquire knowledge at a level determined by their abilities and the curriculum. However, if different curriculum materials are covered and there is no opportunity for collaborative work, then the lesson is structured as follows: the teacher explains the new material according to the curriculum, while students with disabilities complete independent work (aimed at reinforcing previously learned information), assigned before the material is explained to the other students. Then, the class receives assignments for independent completion, and with a group of students with developmental disabilities and difficulties in understanding, work is organized that includes an analysis of the completed assignment, individual assistance, clarification and explanation, and then an explanation of the new material.

This alternation of the teacher's activities continues throughout the mathematics lesson. It is possible and convenient to use instruction cards that outline the student's action algorithm, provide examples, and provide various tasks and exercises similar to the examples given. This approach is applicable to children with various abilities (gifted children, children with intact psychophysical abilities, and children with disabilities). Inclusive education is based on specific didactic principles, which are

important to adhere to in order to achieve the highest learning outcomes. A principle is, first and foremost, a fundamental, overriding idea, a rule of action aimed at achieving high results. Let's highlight the principles and their essence. Adherence to these principles will be positive for the implementation of an inclusive approach.

Table 1. Essence of principles necessary for the implementation of an inclusive approach

No.	Principle	Essence
	Pedagogical optimism	All children are capable of learning. The principle of pedagogical optimism is based on L.S. Vygotsky's concept of a child's "zone of proximal development," which demonstrates the central role of learning in their development and allows for the prediction of the onset, progress, and results of an individualized program. This principle eschews the concept of a "ceiling" for knowledge; anyone can infinitely improve their skills and abilities.
	Corrective and compensatory education	This principle provides support based on the learner's healthy abilities and the construction of the educational process using the body's intact systems and functions.
	Early pedagogical assistance	One of the most important conditions is the early identification and assessment of developmental delays in a child's development to determine their educational needs.
	Activity-based approach	Joint subject-based practical activities under the guidance of a teacher (working in pairs and subgroups) create a natural environment for motivated verbal communication.
	Need for specialized pedagogical guidance	Constant and patient guidance from the teacher, and the teacher's careful alignment of children's individual capabilities and abilities with the need to achieve educational standards.

	Socially adaptive education	Overcoming or significantly reducing "social exclusion," developing various structures of social competence and psychological preparedness for life in the surrounding human-sociocultural environment.
	Development of thinking, language, and communication as tools of special education	Assistance in the development of speech, thinking, and communication in children with disabilities, gifted children, and children with normal intelligence.
	Differentiated and individualized approach	A differentiated approach to students with special educational needs in a group learning environment is determined by the presence of variable typological characteristics. An individualized approach is considered a more specific version of the differentiated approach. It is aimed at creating favorable learning conditions that take into account both the individual characteristics of each student and the specific characteristics characteristic of children with a particular category of developmental disabilities.

In classes with high subject mastery levels, teachers can afford to frequently change the lesson structure. This enlivens the teaching. However, with low mastery levels, monotony is key, giving students the peace they need to reflect. If students aren't rushed, rushed, or held accountable, they are able not only to reason in the right direction but also to demonstrate original answers. Of course, at a slow pace, it's impossible to cover a large amount of problems and information. However, it's far more productive and effective to thoroughly analyze, record, and, most importantly, understand and subsequently apply them than to simply jot down a series of problems. Each student keeps a small notebook in which they accumulate information that requires memorization: formulas with explanations, rules with examples, reference notes, diagrams, and definitions. Children with disabilities often have difficulty with

free memorization. Time must be found for memory training. Some find it easier to remember diagrams and numbers, others images, and still others words. In middle school, the volume of information increases, making it more difficult to remember. With this in mind, students are given tasks. For example, remembering the shapes in a given drawing. Students look at the drawing for one minute, then the teacher removes it, and they try to reproduce what they saw in their notebooks.

When the work is completed, the image is compared with the original. Children sometimes begin to "cram" rather than study, resulting in a failure to reconstruct the flow of reasoning. Therefore, we use the phrase: "If you forgot, don't remember, just think." For example, reproducing data from the multiplication table. Beyond lessons, interaction with children can be achieved through organizing math games, quizzes, and outside of class time, where everyone can fulfill their responsibilities. The main methodological innovations today are related to the use of interactive methods, including information and communication technologies. Information technology allows for a shorter learning period, an increased knowledge retention rate for students with disabilities, increased motivation to acquire new knowledge and skills, and a reduction in stress for both children with disabilities and gifted children, as well as the rest of the class. The significant capabilities of computer presentation allow for the content of mathematics lessons to be modified and infinitely enriched; completing assignments and exercises using a computer creates opportunities to enhance the intensity of the lesson. Positive factors of using information tools in the classroom: an increase in the number of training tasks, achieving an optimal pace of student work, dialogue with the computer takes on the character of an educational game, and most students experience increased motivation for learning activities.

. In mathematics lessons, various areas of ICT application can be used: 1. Application of presentations: • stage of knowledge actualization; ICT allows you to quickly and effectively repeat the material covered. • explanation of new material; A computer, at the stage of acquiring new knowledge, is a powerful demonstration tool that provides a high level of clarity. The teacher’s explanation and screen

demonstration together allow you to focus students' attention on particularly significant points of the educational material. For example, with the help of a computer we can display definitions, formulas, theorems and their proofs, moving visual images, drawings for geometric problems on the screen. • mastering the educational material through the introduction of a system of oral exercises. This system can help students practice the technique of calculated actions, complete tasks of varying difficulty levels correctly and quickly, develop memory, attention, and speech. • solving various problems; In problem-solving lessons, presentations can be used to offer a larger number of typical problems based on existing drawings, demonstrate the solution algorithm, problem design, and demonstrate a detailed, step-by-step solution, all with minimal time investment. 2. Using the Internet.

The Internet offers users the opportunity to quickly and easily access all the information accumulated by humanity throughout its history. Information technology enables students to independently research materials published online for preparing reports and essays, and provides assistance in finding answers to challenging questions. 3. Using an interactive whiteboard. Many teachers continue to dream of an interactive whiteboard in the classroom. Such a board allows for the management of presentations, information materials stored on the computer, and test assignments of varying difficulty for basic and advanced levels of learning. A significant advantage of information methods and tools for teachers is the ability to accumulate and systematize student errors and identify the causes of their occurrence. They also facilitate, if necessary, adjustments to the content, organization, and methods of student instruction. The use of information methods and tools does not replace the teacher; it enriches their work with new content, allowing them to focus on students and their educational and developmental functions. Thus, by using information and communication methods of teaching in mathematics lessons, the teacher: 1) accepts students with disabilities "like any other students in the group"; 2) includes all students in group interactions, in the same types of activities, having the opportunity to set different tasks, receiving, in addition to their completion, interaction and a deeper assimilation of a particular topic

in a short period of time; 20 3) also uses other strategies of collective participation - games, joint projects, laboratory work.

The introduction of algorithms and their use in the study of various topics is included in the school mathematics curriculum and is also a method for achieving goals in inclusive education. Let's imagine a class of 20 students, five of whom have disabilities and achieve 3.4 grades, two are gifted and achieve 5.0 grades, and 13 students achieve 3.4 grades and possess intact intelligence. Without a doubt, a lesson with such a class should be supported by visual aids to facilitate comprehension. This could include the presentations mentioned above, or use posters and cards prepared in advance. Children with disabilities rely primarily on visual perception and visual-figurative thinking; they struggle to fully utilize verbal and logical thinking, as this is often impaired. Taking into account children's poor attention span is an important and fundamental requirement for lessons in an inclusive class. Children who receive a -3 grade for their learning, due to an incomplete understanding of a particular topic, often "disengage" from the process, while children with disabilities quickly become exhausted from monotonous activities. If the lesson is monotonous or the activities change, the teacher must motivate throughout the lesson: alternating oral and written work, working with complex, logical problems only in the middle of the lesson, setting the tone for work at the beginning of the lesson, and supplementing the lesson with tasks to train memory and attention. Organizing story-based and motor games, mini-performances, group and role-playing activities encourages interaction and communication between children in the classroom.

In classes with this type of student, each task is completed according to a specific algorithm. It shows what needs to be done, and based on this, the student understands how to do it and can then act independently. This develops their thinking, allowing them to build a foundation and practice skills and abilities. Key points (important moments) must be emphasized at every stage of the lesson. All teacher words should be brief and clear, and they should speak only to the point, as all students absorb this type of information in a small, minimal amount. Individual assignments are used to

practice the material covered, allowing each child to test their understanding and identify areas where they struggle. Inclusive classes accommodate students of varying abilities, so to prevent a decline in interest among gifted children and those whose academic performance is defined as a "B," it is necessary to provide them with additional assignments, or to allow strong students to complete complex tasks independently, while the rest of the students work through each step together. Supporting materials for completing assignments can be displayed on the classroom walls or the chalkboard. If time is available, the teacher also needs to create a grading scale that will allow for a comprehensive assessment of the student's progress, their diligence and effort in completing the assignment, and, of course, the individual student's knowledge and skills. Thus, algorithmization makes it possible to achieve results in mathematics, as actions are clearly practiced and a sequence is established, leading to effective mastery of a given topic.

Subsequently, by helping individuals develop and utilize various algorithms leading to success, the effectiveness of lesson planning is enhanced by a differentiated approach to teaching mathematics, which actively utilizes the methods, principles, and tools described above. Differentiated learning is a form of organizing the educational process in which a teacher works with a group of students, formed based on their shared characteristics that are significant for the educational process, or as part of a general didactic system that ensures the specialization of the educational process for different groups of students, facilitating the development and growth of their personal qualities. Teaching each student at the level of their individual capabilities through the system is possible through the formation of small groups. Group work is structured so that each member can contribute to the final result by completing a task or assignment. The need to consider the individual characteristics of each child is also taken into account. For example, when applying a differentiated approach to teaching, one can utilize its component: CSO - collective learning. Students work with each other in turns, swapping roles: "teacher-learner." This approach can be used when learning new mathematics material without the teacher's guidance. Students are assigned a series of

topics (for example, 3-4). When choosing topics, it's important to consider the following: students can study them in any order; topics should be short and clear, divided into paragraphs with complete thoughts in each, simplified if necessary, accompanied by study algorithms, and distributed so that students of different abilities work on each topic simultaneously.

Tak my poluchaem vozmojnost vovlecheniya vsex rebyat v uchebnopoznavatel-nuyu deyatelnost, nezavisimo ot urovnya usvoeniya imi uchebnogo materiala i fizicheskikh vozmojnostey. Vmeste s tem u obuchayushchihsya s vysokim urovnem usvoeniya uchebnogo materiala, sozdayutsya sredstva dlya tvorcheskogo rosta, a s bolee nizkim urovnem usvoeniya uchebnogo materiala vozmojnost usvoeniya uchebnogo materiala s perspektivoy uspekha. Naprimer, ispolzovanie: case-method na urokakh mathematician. The case method includes concrete educational situations, which are constructed based on the basis of the studied material. I dayot uchitelyam vozmojnost samim sozdavat dlya detey uchebnyy material, ottalkivayas ot ix osobennostey. Rabotaya s keysom, rebyonkom analiziruetsya kakaya-libo situation, dlya solution kotoroy necessary primenit poluchennye prakticheskim putyom znaniya. Soljnost keysa tak — je opredelyaetsya i zavisit ot vozmojnostey obuchayushchihsya. I agree, if there is a case for a girl with ZPR, predostavte emu znakomuyu bytovuyu situatsiyu, v kotoroy on sposoben sokoyno orientirovatsya. Esli u rebyonka, naprimer, oslablennoe zrenie, daite emu nabor izbrajeniy (in enlarged format) i daite proslushat audio. Casey tak-je variruyutsya po urovnyu slojnosti, sozdavaya raznourovnevye situatsii, sposobstvuyushchie razvitiyu vsego contingenta v klasse. The method of cases allows children with individual characteristics to show their analytical skills, to learn team work. Mathematics obladaet shirokimi vozmojnostyami po razvitiyu intellectu shkolnika. The teaching of postroeniya uchebno — vospitatelnoy deyatelnosti na uroke i ot mesta, kotoroe zanimaet v nem uchenik, depends not only on the productivity of the cognitive process, no i razvitie ego lichnosti. Mathematics, okrujaet kajdogo iz nas povsyudu, tolko, blagodarya eyo zakonomernostyam, sostavlennym zadaniyam na matematicheskom zyyke, vozmojno, razvit istinnoe

shlenie, logicu. Pri reshenii i sostavlenii matematicheskikh zadach uchashchimsya mogut predlagatsya razlichnye kartinki, po kotorym im necessari sostavit i reshit zadachu. Pri vozniknovenii trudnostey, uchitel pomogaet rebyonku nayti vykhod iz slojivsheysya situatsii, zadavaya navodyashchie voprosy. Neobkhodimo podzlo instruktirovat uchashchixsya o vypolnenii domashnego zadaniya i vydavat nebolshoy obem, privetstvuyutsya tvorcheskie zadaniya, kotorye budut motirovat uchashchixsya k sleduyushchemu uroku. In the use of training material, sleduet prinyat to, chto necessari vydavat takie zadania, gde ne necessari mnogo pisat. What is the subject of the teacher's subject, and how can he use it in print and mathematics, and how to write the basic sled, cards, etc.

The work should be organized individually, as well as in pairs, and collectively, in this way, students will learn to work in a collective, evaluate their possibilities and strive to gain more knowledge, however, in the organization of collective and group work, students should follow the algorithm that was presented earlier. Neobkhodimo davat vozmojnost razvitiya tvorcheskogo potentiala i razvitiya lichnosti i charaktera kajdogo uchashchegosya, eto zaklyuchaetsya v predstavlenii myslennyx obrazov, tvorcheskikh domashnikh rabotakh, razmyshleniy i sravneniy temy mathematiki s predenami okrujayushchego mira i t.d. Takje sleduet razdelit zadaniya po stepi ix slojnosti i dat rebenku pravo vybora svoey otsenki. Raznourovnevye zadaniya — eto didakticheskie materialsy kotorye razlichayutsya po ob'emu i urovnyu slojnosti, po stepi obsobnosti uchashchixsya, po characteru uchebnyx deistviy pomoshchi uchenikam [15]. And also diagnostic test materials, which are designed to control skills and knowledge and to develop probelov and nix. Tak on nauchitsya realno otsenivat svoi znaniya i budet stremitsya povysit svoi uroven obrazovaniya.

Dlya activizatsii deyatelnosti uchashchixsya and uchashchixsya OVZ mozno na urokax vozmojno ispolzovanie sleduyushchie sredstva:

1. Ispolzovanie signalnykh cardochek, pri vypolnenii zadaniy.

2. Ispolzovanie vstavok na dasku pri vypolnenii kakogo-libo zadania kotoraya zaklyuchaetsya v prikreplenii detmi svoix kartochek na dasku.

3. "Uzelki". Dannyy sposob, zaklyuchaetsya v zakreplenii na vidnoe mesto osnovnykh momentov temy uroka, kotorye nekhodimo zapomnit.

4. Work on cards, which are accompanied by recommendations for the fulfillment of tasks, napravlennykh and activation of cognitive and educational activities for the child.

5. The use of video and illustrative-audial material allows you to include two video memories: auditory and visual.

6. Illustrative material for changing the screw thread, ispolzuyushchiysya v hode zanyatiy. Vse vysheperechislennye principles, methods, means, yavlyayutsya elementami tekhnologii differentiatedsirovannogo obucheniya, v razlichnoy stepi vliyayushchimi na vospriyatie uchebnogo materiala i na motivatsiyu poznavatelnoy i uchebnoy deyatelnosti uchashchikhsya.

Takim obrazom, absolutely not all stages of lesson and inclusive class, differentiating a wide range of applications: organizational stage, motivational stage, stage of actualization of knowledge, stage of postanovki tseli and lesson, stage of discovery of new knowledge, stage of control of knowledge i.d.r. Pri moshchi differentiated approach, pri postroenii urokov mathematiki, uchitel sposoben uchityvat uroven poznavatelnogo razvitiya kajdogo obuchamogo, a takje imeyushchiesya trudnosti i vozmojnosti, trebuemye dlya svoeniya, opredelyonnogo urovnya znaniy, umeniy i sposobov deyatelnosti [2]. All of the above forms a small subgroup of methods and means of educational and cognitive development [10]: Methods: • perceptive — methods of visual, verbal transmission, visual and auditory perception of educational material; • logical — inductive and deductive, po analogii; • gnostic — reproductive, problem-searching, investigative, and historical information. Means (L.A. Bokova): • naglyadnye; • verbal; • technical. Pri ispolzovanii opisannykh higher methods, principles and means, yavlyayushchikhsya elements of various modern technological and non-traditional forms of teaching, povyshaetsya motivation k obucheniyu i rezultativnost samogo obuchenia, na osnove uchyota individualnyx osobennostey kajdogo obuchayushchegosya.

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