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METHODS OF STUDYING ADDITION AND SUBTRACTION OF TWO-DIGIT NUMBERS IN ELEMENTARY SCHOOL

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Abstract

The article provides an idea of improving the methods of performing actions on two-digit numbers of pupils of primary classes. Two-digit numbers on the addition and subtraction methods are shown.

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The control action is necessary for younger students when studying all academic subjects, including mathematics. One of the most important topics of the initial course of mathematics is the topic "Arithmetic operations", which includes the study of addition and subtraction operations. Let's take a closer look at this aspect of the topic.

In the modern educational space of primary schools, there are several accepted educational and methodological complexes due to the variability of education in the Russian Federation. Accordingly, the period of study of a particular topic depends on the educational system chosen by the school. However, the basis of training courses is methodology. In our study, when selecting a methodology for studying addition and subtraction of two-digit numbers in elementary school, we focused on the authors of the methodology for teaching mathematics.

In mathematics, the generalization of arithmetic operations led to the concept of operation, and then to such concepts as" mathematical structure"," group"," ring"," field", which play a huge role in modern mathematics and its application in various fields of life.

The study of addition and subtraction allows students to come into intuitive contact with many mathematical ideas, in particular with the ideas of functionality, mathematical structure, mathematical modeling, and the duality principle. Addition and subtraction have a great potential for the development of thought, speech, formation and development of universal learning activities.

S. E. Sareva believes that arithmetic operations in modern forms of notation are convenient for observing and discovering patterns, constructing numerical sequences. They allow for the invention of methods for performing actions and corresponding algorithms, methods for converting numerical expressions, and therefore can serve as a means of developing independent thinking and creative abilities. The task of learning computing has not lost its importance, although in our time the role of

computing skills has changed. The goals of studying arithmetic operations and the requirements for the results of theirstudy have also changed.

Let's list the goals of learning arithmetic operations by students in primary classes:

проп propaedeutic introduction to the key ideas of mathematics;

- personal and intellectual development;
- achieving substantive results;

развитие development of ideas aboutnumbers and arithmetic operations;

formation of computational skills and abilities.

In the excerpts from the Approximate basic educational program of primary general education in the course "Mathematics and Computer Science", the planned results and content of the section" Arithmetic operations "are noted. " Approximate work programs of academic subjects", the following content of the section is noted"Arithmetic operations":

a numeric expression.

установление setting the procedure for performingactions in numeric valuesexpressions with and without parentheses.

нахождения finding the value of a numeric expression.

использование use of arithmetic operations in calculations (permutation and grouping of summands in the sum, multipliers in the product);

algorithmsfor written addition and subtraction of two-digit numbers;

способы methods for checking the correctness of calculations (algorithm, reverse action, reliability assessment, result estimation, calculations on a calculator).

"Planned results of mastering the basic educational program of primary general education" summarizes the results of the section "Arithmetic operations":

The graduate will learn: to perform written actions with multi-digit numbers (addition and subtraction of a two-digit number) using algorithms of written arithmetic operations;

perform verbal addition and subtraction of two-digit numbers; select an unknown component of an arithmetic action and find its value; calculate a numeric expression.

The graduate will have the opportunity to learn how to: perform actions with quantities; use the properties of arithmetic operations for the convenience of calculations; check the correctness of calculations (using the reverse action, estimating and evaluating the result of the action, etc.).

The content of computational activity is an integral part of knowledgeabout arithmetic operations, relationships and their properties.

Computing skills and abilities involve complex relationships and relationships. In this regard, when organizing students ' computing activities, it is necessary to clearly understand the goals of learning computing and learning tasks aimed at achieving the goals set.

Addition is an arithmetic operation that is marked with a " + " sign (plus). In the sphere of natural integers, as a result of adding these numbers (terms), a new number (sum) is determined, which defines as many units as there are defined in all terms.

Subtraction is an arithmetic operation that is the opposite of addition, i.e. finding one of the terms by the sum and the other term. In this case, this sum is called the reduced one, this term is called the subtracted one, and the desired term is called the difference. It is indicated by the "–" (minus) sign.

Arithmetic operations are key terms in number theory and the most important feature of sets of numbers. Their study is an integral part of building the concept of numbers and computational skills. One of the main tasks of re-teaching mathematics in primary schools is the formation of students ' computational skills. Much attention is paid to this in the primary school mathematics curriculum, which aims to improve the quality of teaching mathematics to younger students, primarily through the formation of strong numeracy skills, conscious and thorough assimilation of oral and written techniques.

While studying the topic "Addition and subtraction of two-digit numbers", students already know the meaning of addition and subtraction, the law of commutative addition (permutation of terms), the ratio of numbers in addition and subtraction, can add and subtract in cases based on knowledge of the decimal composition of numbers, and know the procedure.

Written and oral calculation techniques differ.Written calculations are based on oralcalculations. The quality of all subsequent computational work within 100 and with multi-digit numbers depends on the degree of formation of oral computing skills within 100.

Let's define the goals of studying addition and subtraction by students:

formation of computational skills and abilities; development of arithmetic operations and the idea of a number; intellectual and personal development; achievement of subject results;

propaedeutic introduction to the key ideas of mathematics.

Personal and metasubject results are determined by:

- inclusion in the process of studying the existing and emerging subject numerical experience of students, the experience of cognition;
- the nature of students ' understanding of computing skills, including discussion of not only their narrow-subject, but also cross-subject aspects;

усил increased attention to logical connections and the meaning of arithmetic operations.

Formed attitude to people, to the world, to oneself, to study, to numbers and arithmetic actions – personal results of studying arithmetic actions. Metasubject results of studying arithmetic operations also include universal learning activities formed during the study of any educational material.

Subject results arewhat every student will know about arithmetic operations as mathematical objects, what they will learn and have the opportunity to learn and learn. The role of the primary school teacher is to ensure that all students who have completed primary classes achieve the subject results of arithmetic operations in accordance with the requirements of the Federal State Educational Standard of Higher Education.

Consider the study of this topic in the educational and methodological kit "School of Russia": in the second grade, the mathematics textbook by M.I.Moreau et al. contains the topic "Addition and subtraction within 100".

M.I.Moro, S.I.Volkova, S.V.Stepanova note that the following problems arise from the methodology of studying addition and subtraction of two-digit numbers and the requirements of the mathematics program for primary school:

to convey the meaning of the actions under consideration to the children's consciousness;

- ✓ at a level accessible to students in primary classes, in a form accessible to them, familiarize them with the properties of the actions under consideration, which are the theoretical basis of the methods studied for oral and written calculations;

to develop students ' conscious and solid skills for fast and correct calculations;

- to form learners ' assimilation of the connections that exist between actions;

формировать to develop students ' understanding of the basic techniques of written and oral calculations and the ability to consciously choose those of the known calculation methods that best match the characteristics of each specific example.

Work on oral addition and subtraction techniques within 100 starts in the 2nd quarter of the 2nd grade. In this case, the teacher can use some methods that help the formation of computational skills: games, game situations; complex preparatory exercises; including real-life examples in the "oral account"; tasks for developing self-control; using reference signals (arc, ray, visual supports, stroke, frame).

The technology of working on each computational technique is designed according to the same plan: first, the preparation of familiarization with the technique is carried out, then the technique is introduced, then exercises are performed aimed at developing the ability to use the technique in different conditions and at developing a computational skill.

As a result of the study of the method of studying addition and subtraction within 100, the "advantages" and "disadvantages" in the formation of oral addition and subtraction skills in the training system were established. The "advantages" include: preparatory work for the introduction of a new technique; familiarization with the technique; consolidation of knowledge of the technique and development of computational skills; mastering computational skills as a result of training exercises. The "disadvantages" include: monotony of fixing exercises;

Low level of theoretical material; a small number of developmental exercises.

The course aims to form a general method of working in the process of performing addition and subtraction, and students learn computational techniques for individual cases. At the same time, to bring students to an understanding of the sample given in the textbook, they are accompanied by drawings (sticks – units, bundles of sticks – tens, etc.) that demonstrate the features of the computational technique.

To develop strong skills of adding and subtracting numbers within 100 throughout the school year, students in the second grade should be given various exercises for calculations (finding the value of expressions, filling in tables, etc.).

In the second grade, students are introduced to written addition and subtraction in the course of mathematics by M. I. Moreau and others.

The peculiarity of studying written calculations is justified by the fact that primary school students are rapidly developing fatigue when working with numbers. This is explained by the large number of written addition and subtraction operations. If in the process of performing oral calculations, younger students received the answer of the example quickly enough, then in the case of written calculations, it is necessary to spend more effort and time to get the answer.

In order to quickly master the algorithms of written addition and subtraction, you can distinguish 2 elements of knowledge: writing examples in a column and calculating in a column. A temporary separation of the perception and assimilation of this knowledge in primary school students will help you quickly master the skills of written addition and subtraction. When writing numbers in a column, students ' attention is drawn to the fact that when adding and subtracting the units of the second number are written under the units of the first, and tens are written under tens. It is noted that mastering examples of addition and subtraction in a column is separated from the answer not by a sign equal to "=", as is done in oral calculations, but by a dash.

A large number of operations also require more focused attention. It is precisely because of the decline in attention that younger students are more likely to make mistakes in the last examples of tasks. Alternating between different activities will help you avoid fatigue when learning written calculations.

It is rational to alternate oral work with written work, problem solving with solving examples, and performing standard tasks in which you need to find answers to examples, it is rational to alternate with tasks that require not only knowledge of written computing skills, but also ingenuity and non-standard approaches to their implementation.

For example, if written addition is taught in class, then after students solve several examples, the teacher may suggest solving tasks so that finding the answer requires a column solution. Then you can practice filling in the gaps in the solved examples. Thus, changing your activity allows you to take a break from the monotony of working with numbers, and also helps to instill interest in studying mathematics.

Primary school students do not get tired so quickly if, in the process of learning new material, they perceive new knowledge quite a lot and get an action plan written down in a symbolic form (sample), also in verbal wording (in the form of an explanation of decisions).

It should be noted that the understanding of algorithms of written calculations will be more complete and specific if the study of the topic is preceded by purposeful preparatory work. For example, when preparing students to learn a written number for addition, the teacher can demonstrate in advance how to sign numbers for addition in a column.

We note that awareness of the material being studied is a great internal incentive to study mathematics. In order to better understand the material being studied, students should be shown familiar elements of knowledge and new ones. This methodological technique is justified by the fact that students in primary classes, listening to the explanation of the material, try to perceive the entire block of material in general, without highlighting the already familiar material. Thus, younger students create additional difficulties, since they cannot simultaneously assimilate a large block of educational material. In the course of studying written calculations, it is advisable to compare the use of the same calculation method – both written calculations and oral ones, for example, bitwise addition.

The study of written calculations provides great opportunities for asking complex questions, organizing a collective search for answers to them, and teaching self-control in the process of performing written calculations. The detected error in the calculation process will save the younger student's internal strength and prevent premature fatigue. For self-control in performing written calculations, it is advisable to demonstrate to studentshow to use reference signals, for example, points that resemble a unit transferred through a digit.

When organizing preparatory work for the study of written addition and subtraction, it may turn out that some students will discover the rules of addition and subtraction in a column without the help of others or with the help of older students. The teacher does not direct students to implement written calculations in the preparatory period, special attention is paid to the study of the topic. The teacher specifically aims younger students to become aware of new knowledge. A high-quality assimilation of the rules of addition and subtraction in a column will be facilitated by a thorough explanation of each step of calculations by the teacher, as well as the formation of computational skills using special tasks, including for self-control.

To explain the rules of written addition and subtraction, you can start by verbally solving examples of addition or subtraction of two-digit numbers without going through a dozen. After verbally performing this action, students independently write down an example in a column. It remains for the teacher to demonstrate that in each of the digits, the numbers add up as a single digit. It is noted that written addition and subtraction should begin with units. It is advisable to go to addition with a transition through a dozen using specially selected examples.

The correctness of performing calculations in a column will depend not only on how students have mastered the methods of addition and subtraction, but also on how accurately they remember the results of calculations, as well as on the ability to control the implementation of addition and subtraction, and

check the final result. When explaining written subtraction with a transition through a dozen at the initial step, those who are poorly performing in mathematics can be allowed to use the point as a reference signal for self-control. Since the dot is not related to the subtraction method, but is necessary for self-control, you can put it in pencil. As computational skills develop, the need for a point will decrease, but the habit of excessive attention will already be developed if there is a transition through the category. If the student is tired in the process of calculating, then he can constantly put an end to it, feeling that his attention is weakened. As a result, the presence of a reference signal is not a mathematical factor, but a purely psychological one.

To consolidate the studied methods of written calculations, samples are of great importance. They can be written on a blackboard or on a poster.

Clear explanations of addition and subtraction methods will help you quickly learn new material.

Learning written addition and subtraction of two-digit numbers allows you to solve important problems: teach students to quickly and correctly do calculations within 100 and prepare them for written addition. Further study of written addition and subtraction in elementary school is associated with the transfer of known methods to large numbers. The quality of calculations performed will depend on how complete the transfer is.

Thus, we can conclude that when studying addition and subtraction of two-digit numbers in elementary school, younger students are already familiar with the meaning of addition and subtraction, the law of commutative addition, the components of addition and subtraction and their relationship with the results, younger students can add and subtract in various situations, are familiar with the basic decimal compositions of numbers, with the order of actions. The goals of studying addition and subtraction in primary classes are the development of students ' computational skills, the formation of addition and subtraction of two-digit numbers and the idea of a number; personal and mental development; propaedeutics of familiarization with the main concepts of mathematics. Also in this section, we looked at written and oral addition and subtraction techniques in elementary school, such as: writing examples in a column and calculating in a column; rationally alternating oral work and writing; and usingспользование the same method when learning new material.

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