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Methodology For Forming The Concepts Of Fractions And Fractions In Primary Grades

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Annotation
This article discusses the theoretical and pedagogical foundations of the formation of the concepts of fractions and fractions in primary grades and the methodology for teaching them. The effectiveness of the use of step-by-step teaching of the concept of fractions, demonstration, practical activities and real-life situations in the example of a 4th grade mathematics course is analyzed. According to the results of the study, lessons organized on the basis of a competency-based approach develop students' logical thinking, calculation skills and independent thinking.
Keywords. Primary education, methodology, fraction, simple fraction, proper fraction, improper fraction, mixed fraction, didactic principles, competence, mathematical literacy.

Introduction

The primary education stage serves as a foundation for students' further education. In particular, the knowledge and skills formed in mathematics develop students' logical thinking, analytical thinking, and the ability to solve problem situations. The concepts of fractions and fractions are an important component of the primary mathematics course, and they are a necessary theoretical basis for mastering algebraic expressions, equations, and functions in later grades [1].

In the 4th grade mathematics textbook, topics such as quotient, simple fraction, proper and improper fraction, mixed fraction, finding a part of a number, and describing fractions in numerical terms are presented in a sequential manner [1]. A scientifically based methodological approach is necessary in teaching these topics. Pedagogical and psychological studies of the theoretical foundations of the concepts of quotient and fraction show that abstract concepts are gradually formed in children [2], [3]. The concept of a fraction is mastered through concrete and practical activities. A quotient is one of the equal parts of a whole.

A fraction is a mathematical notation that shows how many parts of a whole are divided (denominator) and how many parts are taken (numerator). The process of mastering fractions includes the following stages:

– understanding the concepts of whole and part,
– understanding division into equal parts,
– naming a share,
– getting acquainted with fractional notation,
– distinguishing between proper and improper fractions,
– understanding mixed fractions.

According to didactic principles, each new concept should first be taught through concrete examples, and then based on generalization [2].

Main part

The main methods of teaching fractions in primary school are as follows:

The principle of demonstration - Demonstration is the main method in

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primary school. The following are used to teach the concept of fractions: Circle and rectangle models Paper folding method Using chocolate, apple, pizza models Calculating the area using a grid notebook For example, a circle is divided into 4 equal parts and 1 part is colored. Students understand the meaning of the numerator and denominator by looking at the fraction 1/4.

Teaching based on practical exercises - Regular practice is necessary to master fractions. Practical exercises: Finding a part of a number (1/3 of 36) Identifying a fraction based on a picture Distinguishing proper and improper fractions Depicting fractions in numerical light For example, to find 2/5 of a number, the number is first divided by 5, then multiplied by 2. This develops algorithmic thinking.

Problem-solving – Problem-solving questions develop students' thinking: "Is the fraction 9/4 greater than or less than 1?" Students learn about mixed fractions by comparing fractions with whole numbers.

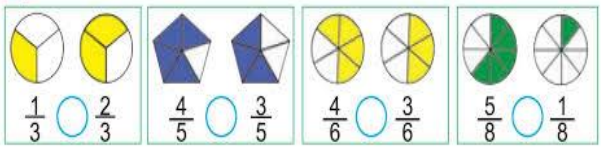
Case-based learning – Relating fractions to everyday life is an effective method: Time fractions (1/4 of an hour) Distance fractions Mass and volume fractions Food preparation This approach increases mathematical literacy (based on PISA requirements).

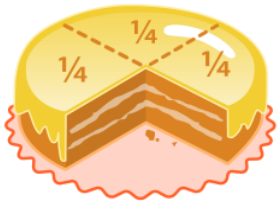
Experimental results. As a result of teaching fractions in primary grades using the demonstration-practical method: The level of mastery of the topic increased by 20–25%. Calculation errors decreased. Independent work skills were formed. Students' interest in science increased. The results show that the competency-based approach is effective.

Based on the topic of "Shares", the formation of fractions is introduced in grades 3-4. Here, too, the main criterion is the presentation of visual aids. The main task is to divide objects, shapes and other objects into equal parts and take one, two, three, ... from these parts, to use and write down the problem. In this case, terms such as fraction, fraction figure, denominator are introduced.

The following methods are effective in teaching the topic of proportion for elementary grades:

1. Visual method of teaching: Using visual materials - diagrams, pictures, weighed sweets, fruits or geometric shapes - is effective in explaining the concept of proportion. For example, by dividing a picture of an apple or pizza into pieces and showing them as proportions, children understand the topic more easily. The visual method attracts children's attention and illustrates an abstract concept through a concrete example.





2. Teaching through hands-on activities: Children learn better by learning through action. They can be divided into small groups and given the task of dividing various objects (fruits, paper squares, candies) and expressing proportions. For example, explaining fractions such as 1/2, 1/4 by dividing 8 chocolates equally among 4 children.

3. Interactive games and problem situations: It is recommended to ask

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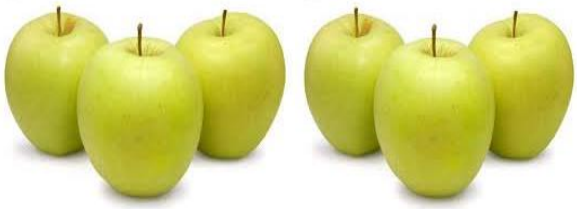
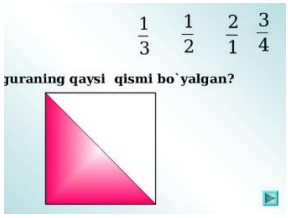
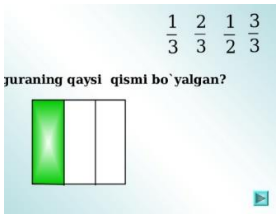
children questions in the form of games or create problem situations to learn about shares. For example, “If you have 6 apples and you share them equally with 3 friends, how many apples will each friend get?” - this question develops children's thinking and increases interest in the topic.



4. Inductive and deductive methods: Inductive method - first showing a specific example, children derive the proportion from the general rule. For example, forming the concept of 1/4 by dividing a set of 4 into pieces. Deductive method - first explaining the rule, and then reinforcing it with various examples. For example, explaining, "If a shape is divided into 4 equal parts, each part is 1/4 of the proportion," and giving examples in various shapes.





5. Analogy and comparison method: Connecting the concept of proportion to everyday examples helps. For example, dividing a pie into pieces, dividing a school notebook or textbook, or dividing a water bottle into equal parts makes it easier for children to understand the topic.

Conclusion

Formation of the concepts of fractions and quotients in primary grades is an important stage in the development of mathematical thinking of students. The methodological approaches analyzed in this article show that consistency, demonstration, and practical activity play a key role in teaching the concept of fractions. The sequential presentation of topics in the 4th grade mathematics textbook (Mathematics. Grade 4. Part III) allows students to gradually form ideas about fractions. According to psychological and pedagogical views, in particular, as emphasized in the studies of Jean Piaget and Lev Vygotsky, abstract concepts are effectively mastered through concrete and practical activities. Therefore, circle and rectangle models, paper folding, tasks based on real-life situations, and interactive games facilitate the understanding of the concept of fractions.

The results of the experimental tests showed that in lessons organized on the basis of demonstration-practical methods, the level of students' mastery significantly increased, errors in calculations decreased, and independent thinking skills were formed. The educational process based on a competency-based approach serves to develop mathematical literacy in students and is consistent with the requirements of international assessment programs, including PISA developed by the OECD. In

general, in the formation of the concepts of fractions and fractions in primary grades, adherence to didactic principles, combining theory and practice, and teaching based on real-life examples provide high efficiency. These methodological approaches create a solid foundation for students' successful mastery of mathematics at the next level.

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