THE FORMATION OF MATHEMATICAL REPRESENTATIONS IN PRESCHOOLERS IN THE PROCESS OF FAMILIARIZING THEM WITH THE CONCEPTS OF QUANTITIES AND NUMBERS

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Abstract: This article examines some of the methodological aspects of the formation of the concept of number and magnitude in preschoolers. Emphasizing that counting is a mathematical concept, this is an operation aimed at determining how many elements a given finite set contains, methodological features are given for the development of ideas about the natural series of numbers, a technique for the formation of the ability to group objects (2-6 years), the formation of ideas about the plurality and singularity of objects (from 3 to 5 years old), the formation of the ability to highlight 1 and many objects in the environment (from 3 to 4 years old), as well as the method of teaching counting (4-6 years old). based on a comparison of two groups of objects in terms of quantity.

Key words: the concept of number, natural series of numbers, skills, grouping objects, plurality and unity.

Counting is a mathematical concept; it is an operation aimed at establishing how many elements a given finite set contains.

1.5-2 years. Children accompany their operations with many words such as "here", "more" or numbers in any order. The child correlates each repetition with one object and one movement, thereby establishing a one-to-one correspondence between the number of objects and the number of words, movements.

2-4 years. There is an interest in comparing sets by establishing a one-to-one correspondence. The sequential naming of numerals does not mean mastering the counting process, because the child does not understand the total of the account, i.e. does not know how to answer the question "how much?" The account does not yet serve as a means of determining the quantity. Most often, the named numeral serves as a signal to stop naming the numerals.

4-5 years old. Children begin to use numbers in a specific order and distinguish the total from the counting process. They begin to understand that equal sets are always referred to as one number.

5-6 years old. They learn the sequence of naming numbers, understand that quantity does not depend on the direction of counting, that number is an indicator of quantity, understand the

relationship between numbers, i.e. master the countdown.

6-7 years old. They master the counting in groups, i.e. understand that the unit of account can be not only a single subject, but a whole group.

7-8 years old. They master the counting by tens and a new activity - computing. Counting is associated with a specific set, with the determination of the quantity in a specific set, and calculation is an abstract operation, here only numbers are involved (without naming the subject).

Development of the concept of number. 3-4 years. Children use numeral words, but do not understand what a number is. At this stage, children are only able to compare different sets by establishing a one-to-one correspondence.

4-5 years old. Children can compare numbers based on comparison of sets, but they do not perceive number abstractly, without a set.

5-6 years old. Able to compare any numbers based on the transitivity property. When measuring, a number is understood as a measurement result, i.e. as the ratio of the entire value (whole) to the conventional measure (part). Understand that the number is only an indicator of quantity. There is an abstraction of numbers from specific sets.

Development of ideas about the natural series of numbers. Natural series - a sequence of positive integers in ascending order.

2-4 years. Based on the speech of adults, children begin to use numerals early: first chaotically, then orderly. Awareness of the order of the numbers occurs immediately in 2 directions: the sequences of numbers that children memorize increase, they begin to realize that each number always takes its definite place, but at this stage they do not understand why this is happening.

4-5 years old. Children cannot always answer the question of which number comes before and which number comes after. Can't name the previous numbers. For them, the row moves, as it were, forward (they understand only the last numbers). Such an idea of the natural series is called "the spatial image of the natural series of numbers." To find a number one more, children mentally or aloud begin to call word-numbers from the beginning of the series. Thus, the difference relations between the previous and subsequent numbers have not yet been mastered.

5-6 years old. Empirical ideas about the natural series as a spatial image are reconstructed into the concept of the natural series of numbers. Children begin to realize the basic principle of constructing the natural series ($n` = n + 1$).

Formation of the ability to group objects (2-6 years). Stage 1. Isolation, finding and naming of signs of objects. First, they teach to group according to one attribute, while all other signs should be absent or insignificant for children. The attribute by which the grouping of objects is proposed becomes more complicated with age (color – name – size – form – quantity – characteristic functions). For example: put all the cars on the bottom shelf, and the dolls on the top (by name), children have geometric shapes of the same color, but different shapes, you need to build turrets from cubes (or cylinders).

Stage 2. Grouping by two - three or more criteria. In this case, objects should differ only in these signs or other signs should be insignificant. For example: take big red cubes for construction (and the figures differ in shape, color, size), build a chain so that the figure differs in size and shape.

Stage 3. Grouping items by pattern. Signs are not verbally indicated, objects should differ in

several ways, children must themselves find common signs and group them. For example: bring these toys to the table.

Stage 4. Grouping by a given attribute. The items differ in several ways, but only one is indicated. The easiest signs are color and name. The most complex are the functions of the subject. For example: name objects in the shape of a circle, collect and put in a basin toys that can be washed.

Formation of ideas about the plurality and singularity of objects (from 3 to 5 years old). Exercises or games are conducted with children, in which it is shown that the set consists of separate elements. Children are shown how a set is formed and how a set is broken down into individual elements. To begin with, a lot of homogeneous objects are taken. Attention is focused on the words: "How much?", "Many", "One", "None". For example: children collect leaves, the teacher selects uniform leaves according to the number of children and says: I have a lot of leaves. - How many leaves do I have? (A lot.) I give out one at a time. You have one, you have one, you have one. The leaves are getting smaller and smaller. I have none left. How many leaves do you have? (One.) How much do I have? (None.) I collect leaves: one for you, one for you, one for you. I have more and more leaves. Again I have a lot of leaves. How many leaves do I have? How much do you have left?

This exercise is performed with different types of objects several times.

Later, this problem is solved with inhomogeneous sets. At 5 - 6 years old, children are shown that objects can be grouped according to different criteria, without taking into account insignificant signs.

Formation of the ability to highlight 1 and many objects in the environment (from 3 to 4 years old). Stage 1. One or many objects are located on different planes (2 different tables, 2 hoops). Questions and tasks: show me where there is one, and where there are many, how many items are on the red strip, and how many are on the blue?

Stage 2. One or many objects are mixed on the same plane (bunnies and 1 squirrel). Questions: what items are there, and which one, how many bunnies, how many squirrels?

Stage 3. An exercise is proposed where one object contains many objects (one tree, and there are many leaves on it; one aquarium - many fish).

Stage 4. One and many objects are not limited to any planes or a single object. Children should mentally combine them into a group. For example: one doll at a time on a chair, carpet, closet, and in total there are many dolls.

Games at all 4 stages (the only difference is in the location of the visual material):

"Travel" or "Train with stops" (The teacher finds out how many items are at the station. If the children have answered all the questions, then they go to the next station).

Formation of the ability to compare 2 groups of objects in terms of quantity, by establishing a one-to-one correspondence (from 3 to 6 years old). There are 6 methods for establishing a one-to-one correspondence: overlay (junior return), application (junior rev.), Pairing (junior - avg.), Connection with arrows (avg.), - use of an intermediary set (old return), invoice (Wed - old return)

Overlay. Visual material: cards with depicted objects (3 -5 pcs.), The distance between the objects should be equal to the objects themselves, small objects are given for imposition, which should be associated with the drawings by meaning.

Application. Cards with two stripes are used. On the top are items and the bottom is empty.

For the application, items are selected that fit the meaning.

The method of teaching the reception of the application is based on the knowledge of the children of the overlay reception. For example, we put mushrooms on the top strip. Then we create a situation: leaves fell on the mushrooms. We put the leaves on the mushrooms and find out if there are equal parts of them. Then we sequentially drag each leaf onto the bottom strip: "the wind has blown." There is only one leaf under each mushroom. There are empty spaces between the leaves. "Will the leaves and mushrooms be equal now? If there is one leaf under one mushroom, then there are equal parts of mushrooms and leaves. "

Exercise: put as many leaves on the bottom strip as there are mushrooms on the top. If the children find it difficult, then we divide the card into cells with vertical lines or you can draw arrows from the objects of the upper strip to the lower one.

Pairing. This technique is similar to the application, but cards are not used. The objects used are related to each other in meaning. First, we arrange the objects in a row. For example, sweets yog feel the dolls. In the future, it is not necessary in a row (it is possible in a circle). The teacher finds out whether, for example, there are equal parts of squirrels and bunnies. To check the answer, you need to put one squirrel about one bunny.

Arrow connection. Children are offered a situation in which it is impossible to use the techniques they are familiar with (A cake and children are drawn. "Will all the children have enough of a piece of cake?"). In the picture, we connect one child with one piece of cake. If there are no extra children left, then everyone has had enough.

Using an intermediary set. We create a situation where it is impossible to use techniques known to children. For example: trees grow on one side of the kindergarten, on the other - too. Where do more trees grow? We use an intermediary set - pebbles. We lay out one pebble under one tree. First, under the objects of one set, then under the objects of the second set. We draw a conclusion about the equality or inequality of objects in terms of quantity.

We give each of these techniques in two stages. First, we form in children an idea of the relationship of equality ("equally"), for this we take equal sets. And at the second stage, we form an idea of the relationship "more" and "less". We explain the concept of "more" through the word "extra", and "less" - through "not enough".

Methods of teaching counting (4 - 6 years). Learning to count is based on a comparison of two groups of subjects in terms of quantity.

Stage 1. The teacher himself leads the counting process, and the children repeat the final number after him. The independence of the number of objects from other attributes of objects is shown.

Stage 2. The teacher teaches children the counting process and introduces them to the formation of each number, teaches them to compare adjacent numbers. First, children are taught to count within 3, and then within 5, then - 10 (along Praleska Ave.). Consider an example of learning to count to three. At stage 1, the teacher offers children two groups of objects, arranged in two parallel rows, located one under one (bunnies and squirrels). Questions: how many bunnies (squirrels)? will bunnies and squirrels be equally divided? Then one item is added to one of these sets (a bunny galloped). Will squirrels and bunnies be equal now? How many bunnies were there?

At stage 2, teaching children the counting process, the teacher encourages them to adhere to the following rules:

1. To coordinate each numeral with one object and one movement.

2. To reconcile the numeral and noun in gender, number, case.

3. Do not repeat the noun after each numeral (so that the counting process is abstract).

4. After naming the last number, it is necessary to circle the entire group of objects in a circular gesture and name the final number.

5. Calling the final number, pronounce the corresponding noun.

6. Counting must be done with the right hand from left to right (so that the children have a stereotype).

7. You cannot say the word "times" instead of the numeral "one" to answer the question "how much?".

It is necessary to rely on a comparison of two sets in terms of quantity. Questions:

How many squirrels? (two) How many bunnies? (two). Add one bunny. How many bunnies are there? How much was it? How many were added to make it 3? How do I get the number 3? (We need to add one to two, we get 3).

In the future (after the children learn to count to four), it is necessary to show the formation of the number 3 by decreasing the set by one. Thus, the formation of each number is shown in two ways, by increasing and decreasing the set by 1.

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