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THE DEVELOPMENT OF CONSTRUCTIVE THINKING IN A PRESCHOOL CHILDREN AS THE BASIS OF THEIR MATHEMATICAL DEVELOPMENT

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Abstract:

This article discusses the of constructive thinking in preschool children as the basis of its mathematical development and the conditions for its implementation. When we design the problem of mathematical development of preschool children, we mean the material modeling of various objects, concepts and relationships. A model made in this way is called a mock-up or construction. The purpose of teaching design is to teach the basic techniques of modeling at the simplest demonstration-practical level, that is, at a level that corresponds to the visual-practical thinking of children aged 3-5 and the visual-figurative thinking of children aged 6-10. Thus, we understand design activities in a much broader sense than what is accepted in the traditional methodology of teaching preschool design.

Keywords: Development, preschool children, design, constructive thinking, constructive case, analysis, synthesis.

1.INTRODUCTION.

Design training means the formation of general constructive skills and the development of constructive thinking on this basis. By constructive thinking we mean the ability to see (imagine) an object in a complex way and at the same time to imagine the proportions of its parts. In this mind, the ability to make an object seemingly transparent, but not to lose the contours of its constituent parts, that is, to see invisible lines and parts, as well as the ability to think about an object, to "look" at it from different angles, .

This definition of constructive thinking shows that it is closely related to spatial thinking, spatial thinking refers to the ability to create a model in the imagination (at the level of consciousness) and mentally change it according to given parameters (shift, cut, transformation).

This interdependence allows us to reasonably assume that the development of constructive thinking in preschool is a way and means of stimulating and developing spatial thinking, and that spatial thinking in turn is an integral part of mathematical thinking.

Since working with preschool children cannot be based on working with complete spatial images of different mathematical concepts (because the database of images on the child has not yet been formed), there is an assumption about the possibility of organizing work on the formation of spatial thinking in children. Using such an approach to the process of shaping the spatial thinking of a preschool child, it will be possible to form the basis of initial images of concepts (memory images) and images of modes of action (images of operations) through design activities with material models suitable for the child. The process of mastering this activity at the level of individual operations and general methods of movement helps to accumulate a stock of images that stimulate the development of the child's spatial thinking (and consequently stimulate his mathematical development).

2. THE MAIN PART.

The means of forming constructive thinking are special constructive issues, and the ability to process a given material, i.e. to create new images, corresponds to the child's constructive ability at this stage. Let us now define the terms "constructive issue" and "constructive skill".

A constructive problem is a learning problem in which the situation reflects the basic spatial (plane) relationships, the relationship between metrics and volume. These relationships and dependencies are reflected in a visual model that children ages 3-7 can understand, comprehend, and use. Simple modifications (transformation) of such a model allow to determine and observe the relationship between the elements of the model recorded in it. Independent search, identification and implementation of these actions is the essence of constructive problem solving.

In this case, awareness of the properties of the objects on which the models are created is the result of solving a constructive problem or performing a constructive task.

Thus, constructive skills include:

- the ability to recognize and distinguish an object (the ability to see the most important aspects, ie the ability to abstract);
- Ability to assemble the object from prefabricated parts (synthesis);
- Ability to divide into parts, to distinguish components (analysis);
- the ability to change the shape of the object according to the given parameters, creating a new object with the given properties.

These constructive skills are common and allow the child to carry out constructive activities when working with any material, i.e. they are also used in the implementation of construction in preschool institutions on the basis of traditional understanding (design of natural materials, waste materials, etc.).

From this point of view, construction is considered as a special, specific type of modeling, which is a general way of working with mathematical concepts and relationships, and the formation of constructive skills in the child in the process of modeling mathematical concepts and relationships. On the other hand, the ability to reflect the learned concept or attitude in a material model (layout, construction) allows the child to correctly formulate an abstract object on a visual-practical level and on a visual-figurative level, which is very appropriate to his capabilities and needs.

Such an approach to the formation of early mathematical concepts takes into account not only the peculiarities of mathematics - the science that studies the quantitative and spatial properties of real objects and processes, but also teaches general methods of working with mathematical models of real beings and methods of creating these models. In fact, this approach ensures the formation and development of what is called mathematical thinking.

In implementing such a constructive approach to the mathematical development of preschool children, it is necessary to adapt the stages of organization of the child's constructive activity to the requirements of building models of concepts and stages of formation of mental actions. The most convenient mathematical material for this task is a material of a geometric nature. This material allows you to organize the child's constructive activity with geometric images in two stages.

In the first stage, all the work with models of geometric figures is done by the child on a material level (construction itself): the child with a set of different (first the simplest, then the most diverse) geometric figures depending on the pattern, assignment, imagination, pictures, subjects, performs many different tasks related to creating decorations and other constructions.

In the second stage, it performs the same tasks on a graphical level, that is, the method of "constructive drawing" is used. The main difference of this method from the use of all other options is the use of special frames - stencils with geometric shape holes, which the child uses to create the desired shapes in the picture. In this case, the frame performs several functions: it allows you to create a form that exactly corresponds to the given form (the teacher suggests samples using the same forms); drawing the figure according to the frame, the child repeats this shape each time, thus imprinting his image on his mind at a kinesthetic level. Painting the shape according to the stencil (within the frame cross section) not only develops motor skills, but once again strengthens the image of a flat figure. As pictures and compositions contain a large number of combinations in different positions, the child gradually learns to see and recognize the original shapes in different combinations, angles, overlays, and pieces. Thus, as a result of this type of systematic work, children develop excellent "stability" in memorizing the image of the shape and the ability to perform any action of this shape, as well as the ability to synthesize different compositions from these shapes and disassemble them, change parameters and make other changes. . The tasks that teach children all this have the nature of play, the nature of interesting pictures that are attractive to the child from the outside, they do not lose their appeal to children even as they get older, in general, all this activity is perceived by the child as a game task

While describing a full modeling constructive activity, we can distinguish the work that is part of this activity. The description of the nature of the system and modeling operations allows it to be used in the teaching activities of the teacher. The following modeling activities can be distinguished in the modeling activity (regardless of the material in which it is formed):

A) visual assessment of the proposed facilities;

B) choose the type of model in accordance with the given task (task);

C) transfer the received verbal or visual information to the selected model type (schematic, graphic, material, intellectual, symbolic);

G) change the model in accordance with the purpose (learning task);

D) analysis of the results obtained on the basis of comparison with the original object and the resulting object;

E) transfer the obtained results to an expanded set of objects of this type.

Even when working with school-age children in the process of completing a particular task, it is not always possible to track all the actions on the list. However, a complete modeling activity does not take place at the same time, so it is possible to perform at least 2-3 modeling actions in one or more interrelated tasks at different stages of its formation. In this case, the child's modeling activity becomes a process where each subsequent stage is conditioned by the outcome of the previous step. Such an approach to building a methodology for developing a child's modeling process ensures that he or she continues to move forward towards fullness. Analysis of the above list shows that almost all modeling operations can be taken into account when creating assignments for preschool children. Here are some examples of giving assignments in this way for children of different ages.

Tasks aimed at organizing the modeling of design activities in children aged 4-5 years.

We will consider the possibility of actively incorporating different methods of mental action in mathematical material by performing logical-constructive tasks in the process of mathematical development of a preschool child. Here are some examples of interrelated exercises of logical-constructive nature on the formation of the concept of a triangle for children in the preparatory group. For modeling constructive activity, children use counting sticks, frame-stencils with grooves in the form of geometric figures, paper and colored pencils. The educator uses a flannel graph and cardboard models of sticks and figures.

The educator flannel and cardboard model uses sticks and figures.

Exercise 1 Homework. As many sticks as I have in my hand (2), take as many sticks from the box. Place it on the table as (I I). How many sticks did you put? (2)

- Who has the sticks the same color (the sticks in the box are two different colors red and green)
- Who has the sticks of different colors?
- How many are 1 and 1? (2)

Exercise 2 Take another stick, put it next to the placed sticks (N) How many sticks were formed? Our industry (3)

What does it look like? (To the letter N). Who knows the words with the letter n? (Children say words that start with the letter N)

Exercise 3 3 What shape can be created by changing the stick? (N). What does it look like? (To the letter N). Say words that start with that letter. (Children say words that start with the letter N)

Exercise 4 What shapes can be made from these three sticks? This requires a child's creative approach. Children make different shapes from three number sticks.

Exercise 5 The educator can see that the children have made a triangular shape out of three number sticks. The educator addresses the children and asks the following questions.

- How many sticks did you use to make this shape? (3)

"What shape is that?" (triangle)

"Why a triangle?" (Because it has 3 corners)

If the children cannot say the name of the figure, the educator says it himself and asks the children why it is called a triangle. The children feel the triangle shape with their fingers and show the sides, corners, and boundary of the triangle.

Exercise 6 The task of finding a triangle from different shapes in a frame and coloring it requires children to be able to recognize a triangle and distinguish it from other shapes. The child separates it and paints the inside, which helps the development of hand muscles, the development of finger motor skills.

This sequence of exercises develops the child's logical thinking. For example, Exercise 1 teaches children to compare, Exercise 2 teaches comparison and generalization, Exercise 3 teaches analysis and comparison, Exercise 4 teaches synthesis, Exercise 5 teaches analysis, synthesis and generalization, Exercise 6 teaches classification.

We give the appearance of assignments related to the formation of the concept of the triangle and its elements in primary school 1st grade students.

Exercise 1 The teacher puts different shapes on the flannel, for example, circle, square, triangle, pentagon. Tells students to find a triangle out of these shawls. You will be asked why it is called a triangle.

The purpose of this exercise is to form in the student mental operations such as forming, comparing, analyzing (analyzing) the ability to distinguish a triangle from flat geometric shapes.

Exercise 2 On the flannel, the teacher places a blue circle, a red square, a green triangle, a yellow square, a brown circle, and a red triangle in a row on colored paper.

Addresses students with the following questions:

- How many triangles do you see here? (2ta)
- What color are the triangles? (green and red)
- The green triangle is in the fourth place (3rd place).
- Red triangle (6th place)
- Yes, when it counts from left to right. What is the red triangle that counts from right to left? (first). A green triangle? (fourth)
- Among which shapes is the green triangle? (between red and yellow squares)
- What shape did the red triangle come from? (after the blue circle)

By completing this exercise, students 'skills such as distinguishing shapes related to the relative positions of geometric shapes are strengthened. They contain mental operations such as comparison, analysis, generalization.

Exercise 3 Each student is given 2 circles (blue and brown), a square (red and yellow), and a triangle (green and red) cut out of colored paper. The teacher requires the placement of geometric shapes in a row on the canvas over the student desk. This work can also be given for 2 students sitting at the same desk.

Once the students have completed, the teacher will follow up. Those who make a mistake will correct the mistake. The teacher then assigns the following tasks to the students.

- Arrange these shapes so that there are triangles at the beginning and end of the row, and circles in the middle.

- Arrange these shapes so that the triangle (green) is in 2nd place from left to right and the red triangle is in 2nd place from right to left.

- Arrange circles, squares and triangles in a row. How many places does the green triangle have in you? What about the red triangle?

A series of such assignments can be said differently.

Through this exercise, it is possible to see the formation of students' modeled constructive skills, the development of their creative, independent thinking skills.

Exercise 4 8 equilateral triangles are distributed to 2 students sitting at each desk. It is said that they make different shapes on the desk using these triangles. Students complete the task independently. A variety of shapes are created by children. The purpose of this exercise is to develop students' creative abilities, strengthen their design skills, and develop the ability to work in pairs.

Exercise 5 A geometric shape consisting of triangles was drawn on the board. There are several triangles in the shape. For example,

This task is a task of a cognitive nature, which serves to increase the creativity and attention of the student. To make it more accessible to the reader, a shape is created from the triangles so that the canvas can be divided into parts. Students are shown taking separate triangles so as not to get lost in the count. (electronically displayed).

Exercise 6 Cut out triangles (right angles) using stencil on colored paper and make different patterns out of them. First, the teacher tells you how many triangles to cut. And it shows which shape should fall on the canvas. The children complete this task and show it to the teacher. The teacher then tells the students to create the shapes they want independently. Assignments are creative in nature and are performed differently by different students. Through this exercise, attention, memory, thinking, imagination grow. Modeled creative constructive skills are developed.

Exercise 7 Students are given a checkered sheet. It is said to divide a square of 10x10 cells and divide it into 2x2 cell squares. You will be asked how many squares to form as a result. Divide each square into 2 right-angled triangles. The triangles are colored with a colored pencil. How many triangles are colored? How many are unpainted? This exercise develops students' drawing and painting skills. Counting skills grow. His attention span grows.

3.CONCLUSION.

Since working with preschool children cannot be based on working with complete spatial images of different mathematical concepts (because the database of images on the child has not yet been formed), there is an assumption about the possibility of organizing work on the formation of spatial thinking in children. Using such an approach to the process of shaping the spatial thinking of a preschool child, it will be possible to form the basis of initial images of concepts (memory images) and images of modes of action (images of operations) through design activities with material models suitable for the child. The process of mastering this activity at the level of individual operations and general methods of movement helps to accumulate a stock of images that stimulate the development of the child's spatial thinking.

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