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Gulchehra Mamurjanovna Sofiboyeva PhD  
Namangan State University, gulchexra.sofiboyeva@mail.ru

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# DEVELOPING PUPILS' LOGICAL THINKING ABILITY IN THE STUDY OF GEOMETRIC MATERIALS IN MATHEMATICS OF PRIMARY SCHOOLS

Sofiboyeva Gulchehra Mamurjanovna  
PhD Student of Namangan State University  
[gulchexra.sofiboyeva@mail.ru](mailto:gulchexra.sofiboyeva@mail.ru)

**Abstract:** This article discusses effective ways of teaching geometric materials in the development of logical thinking skills of primary school pupils. We analyzed the approximate appearance of how a pupil can express his or her thoughts in his or her speech.

**Key words:** Thought logical thought comparison, notion, contemplation, willpower, flat and spatial forms, multisided cube.

## Introduction

Current radical changes in our educational system focused on the formation of a harmoniously developed person have become one of the most actual issues determining our future. In the context of Uzbekistan, where great reforms are taking place, the presence of independent-minded young people is a matter of time, and the people who have personal outlook will be able to achieve success in the development of society. One of the main factors of the policy pursued in the republic is the development and upbringing of talented people with logical thinking and independent outlook.

As the president of our country emphasized “Our young people are happy to grow up as independent-minded people with high intellectual and spiritual potential, who do compete with their peers in any field in the world. And I will mobilize the opportunities” [1, p 195].

Teaching geometric shapes to the pupils of primary schools is the first step in their lives to become good professionals and masters of their craft. For example, whether he will be a carpenter or a doctor, a seamstress or a pilot, an

artist or an architect, geometry is necessary for all these professions. “Geometry plays a very important role in radiation oncology, especially in the treatment of tumors, radiation safety, cancer and spinal cord. This method can be used to transmit light as well” [2, p. 41]

One of the biggest problems to be solved today is the formation of thinking skills of pupils of primary school, to develop the ability to solve problems independently, ways to develop logical thinking skills as well. The ability of thinking skills of a person develops slowly. It is based on existing theoretical knowledge and previous practical actions.

In fact, thinking is formed as a result of a child's acquaintance with the environment, choosing from a variety of toys, coloring, recognizing animals, imitating their voices and so on. Gradually, watching cartoons, listening to fairy tales and being critical in life events while playing games will also develop a child's logical thinking.

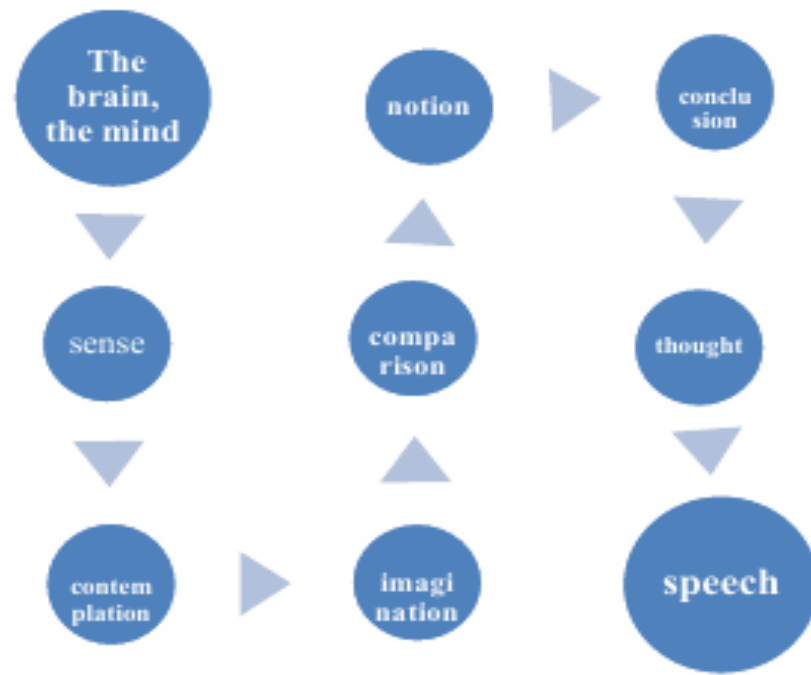
According to Abu Nasr Farabi, “The human body, brain and sensory organs are present at birth, but are formed in communication with the mental knowledge, spirituality, spirit, intellectual and moral qualities, character, customs, knowledge, external environment and so on. The human mind is the most perfect product of spiritual growth”. [3, p.224]

The process of thinking is always based on basic knowledge. The ability to think logically is useful for everyone. Without logical thinking, it is impossible to make discoveries in science, to manage companies and to create new inventions. Teaching pupils of primary schools to think logically can be done in all disciplines in teaching. For example, we focus on logical thinking by teaching geometric materials in math classes. Geometry is not taught as a separate subject. Mathematics is included in the curriculum and is taught on a regular basis.

The characteristics of primary school pupils, such as thinking, logical thinking, reasoning, judging and drawing conclusions, comparing, using different

methods of analysis are formed in preschool education. As a result, our junior researchers begin to think about geometric figures, they think, they compare with each other. They look like objects around them. As a result, our junior researchers begin to think about geometric figures, they think and compare with each other. The child begins to develop the ability to think logically. The brain's signals continue to work in sequence until the person's thinking expresses it in speech. But we do not notice it, as it can happen in a very short time or otherwise. It is very difficult to determine the exact time. Such ideas have been studied by great psychologists. I.P. Pavlov called the sensory organs as the first signaling system. However, “if in animals have first signal and activity remains in the only system, the second signal system is added to this system in humans. According to I.P. Pavlov, it is interpreted by words and called the second signal or signal of signals. Speech activity is socially defined as special neuro-physiological mechanisms and one of the most important qualitative differences in the functioning of the human brain”. [4, p.43]

It is also triggered by signals sent by the brain and mind for the student to think logically (*See Figure 1*). For example, the formation of geometric concepts can be used to explain the development of the pupil's ability to think logically through this sequence.



**Figure 1. Brain signals**

We often explain geometric shapes to the pupils of primary schools through fun didactic games or object comparisons. We observe the movement of the above brain signals in the didactic game “What shape is it” until a pupil expresses in his speech what geometric shape this shape is.

**Didactic game: What shape is it?**

The purpose of the game is to strengthen pupils' knowledge, to focus on logical thinking by introducing geometric shapes and to develop mathematical speech.

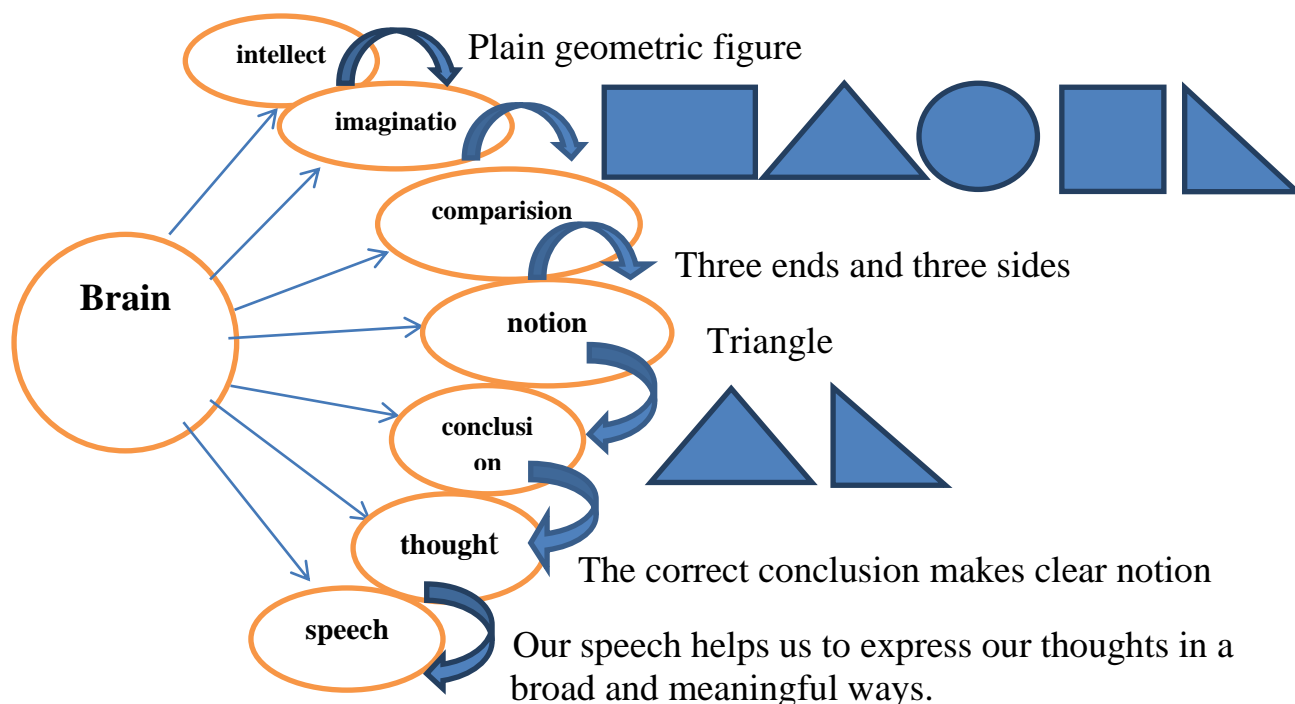
**Required materials for the game:** Models of geometric shapes made of different wooden boards, a bag for inserting geometric shapes.

**Instructions of the game:** Place geometric shapes in a bag and mix well. The participant takes a shape from inside the bag while blindfolded and has to determine what geometric shape it is while holding it in his hand. The game continues in this process.

**Now let's think:** The participant chooses any geometric shape from the bag and immediately realizes that it is a flat geometric shape (See Figure 2). He/she uses

imagination by perceiving shape, sides and ends, and compares and contrasts all geometric shapes. Concepts begin to emerge. We think for a while about judging. Judgment is the conclusion. It is necessary to distinguish similar figures, for example, a triangle (equilateral triangle, right triangle). The correct conclusion expresses a clear idea and is expressed in our speech. Our speech helps us to express our thoughts broadly and meaningfully.

In fact, the sequence in the brain seems to take a very long time, but on the contrary, it happens very quickly. In some cases, you may not even have time to determine it. The opposite may be true, depending on how well the pupil realizes. While most pupils' cognitive cues are activated quickly and might be slower of some of them.



**Figure 2. Activity of brain signals**

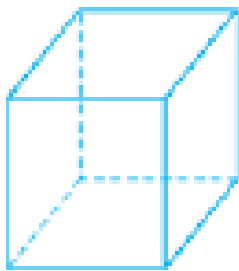
Thus, we analyzed the approximate appearance of how a pupil can express his or her thoughts in his or her speech. We think, it is important to use geometric materials, geometric logic assignments and tasks to encourage pupils to

think actively. Pupils begin to think meaningfully and become more active as the result of selecting important tasks.

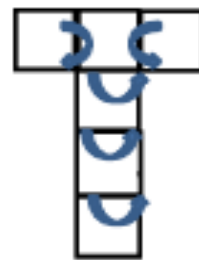
If we select one of the tasks focused on introducing geometric figures in primary school, it will develop to create spatial imagination of pupils; their thinking ability, imagination and worldview. Pupils will be introduced to the world of geometry through activities such as dividing geometric shapes into sets, distinguishing between them and identifying similarities and creating shapes with sticks.

Pupils distinguish between flat and spatial geometric shapes from the 1st grade. By studying flat shapes, aspects similar to spatial shapes are compared. For example, all sides of a square are equal; in what other figures did you meet the square? We create an understanding by comparing them more with the objects around us in introducing spatial figures.

**Cube** - A rectangular parallelepiped consisting of squares is called a cube. The cube has 8 ends, 6 sides and 12 edges. The sides of the cube consist of squares (Fig. 3).

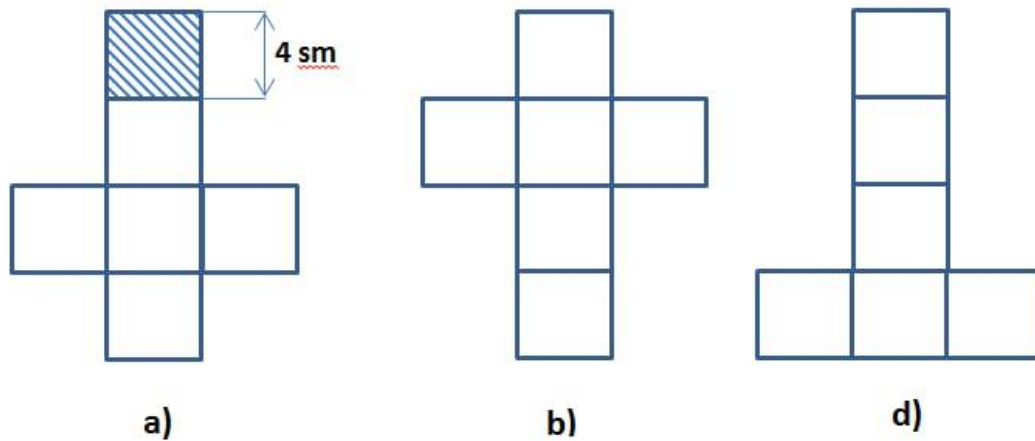


**Figure 3. Cube**



**Figure 4. The square sides of the cube**

It is useful to use the method of construction to introduce spatial figures to the pupils of primary school. Draw 3 random squares and make 3 more squares below the middle square. A total of 6 T-shaped squares are formed. We cut out our finished shape. We fold the marked lines and join the corresponding ends. What figure was formed? Here are some ways to make a cube.



**Figure 5. Plain image of the sides of a cube**

As we can see in Figure 5, the squares lying in the plane are combined to form a spatial figure. This can be done in several ways. Creating a flat view of this multisided require the pupils to be able to think, guess, imagine and think logically. The surfaces of these figures are equal to the surfaces of the side surface of the cube.

**Proof:** Given a cube of arbitrary size, we measure the sides of the sides of the cube and create an image in the plane. Let all the sides of the cube are 4 cm and the sides of the cube are equal to the sides of the squares. If the plain image of one square is  $S_1=4*4 =16 \text{ cm}^2$ , and the plain image of the geometric shape above (Fig. 5 a)).

$$S=S_1+S_2+S_3+S_4+S_5+S_6$$

$$S=16+16+16+16+16+16=80 \text{ cm}^2$$

$$S=5*16=80 \text{ cm}^2$$

So, if the plain image of a geometric shape in a plane is  $80 \text{ cm}^2$ , we cut it to the same size and join the sides. A side of the cube  $80 \text{ cm}^2$  is ready. We align the sides of the cube made of paper with the cube given above and they are equal.

*The location of the sides of a cube in a plane is made up of equal squares and its plain image is equal to the plain image of the sides of the cube.*



In short, we achieve our goals by composing geometric concepts of pupils, equipping them with the skills of drawing, measuring, making, developing logical thinking and improving the method of teaching geometry. From simple geometric shapes to spatial figures, we need to develop the pupil's geometric imagination by using the simplest methods to develop the skills of finding their surface, size and capacity. Geometry is a major part of mathematics and plays a role in education to develop critical thinking and problem solving as geometric shapes are a part of our lives and it appears almost everywhere. Geometric shapes play a crucial role in solving arithmetic operations and comparing numbers. At this point, pupils' conception of geometric shapes continues to expand.

We need to teach pupils of primary school to focus on geometric logic tasks, to be able to think through thinking, to pay attention to consistency in the performance of task conditions which they need to understand. I think that it is important for pupils to have conception to encourage active thinking.

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