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# The Content of Developing Students' Spatial Imaginations Through STEM Education

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**Abstract**
**In this article, preliminary manifestations of the development of spatial imaginations are determined in preschool and primary education, taking into account the young age of a child in a row.**

**Keywords: imagination, spatial imagination, STEM – education, component, competence.**

## Introduction

It involves drawing, designing, and studying geometric materials to shape students' spatial imaginations and improve the skills associated with it. After all, no curriculum can develop spatial imagination and spatial hypothesis without drawing drawings or imagining. In scientific and methodological literature, words such as spatial imagination, spatial hypothesis, spatial understanding, and spatial thinking can be found a lot. However, the meaning of these words has different characteristics because imagination differs sharply from thought and thought from concept. Studying each curriculum allows you to create a spiritual focus that activates a child's process of understanding the material, remembering it, activating effectiveness, developing thinking, speech, and imagination. (Matthew 24:14; 28:19, 20) In particular, knowledge acquired from border science creates opportunities for the development of interconnected types of thinking, the different and similarities of the content of subjects in science, and the application of knowledge, skills, and skills gained from one fan in other subjects.

Shortcomings in the development of spatial imaginations can be evident in engineering courses. Because it is unthinkable for an engineer's work to be carried out without spatial imaginations, drawings, projects. Many research works aimed at developing spatial imaginations have been carried out in the field of mathematics. L.G.Oblakulova methodologically analyzed the types of exercises that helped cultivate an extraordinary picture of the cultivation of spatial imagination in

her research work on the possibility of performing drawings of geometric shapes and developing an extraordinary picture of their drawing[1].

The use of SEM education is an auxiliary tool for developing the spatial imaginations of elementary school students. STEM - teaching in the teaching process aims to individualize the learning process by selecting some subjects and their level of study, taking into account the interests and characteristics of the students. Stem – the curriculum involves conducting extracurricular and practical classes based on students' interests. The objectives of teaching the curriculum must comply with and meet the interests and requirements of society and the state[2].

The gradual implementation of components that develop students' spatial imaginations in elementary schools will result in the development of students' spatial imaginations. The timely development of spatial imaginations in children sets the stage for them to be educated and motivated in any area. Early manifestations of the development of spatial imaginations are developed to some extent at preschool age and are developed in primary education. The table below identifies the level of development of spatial imaginations in children, taking into account the young age of a child in a row.

**Indicators of the development of spatial imaginations in children**

| T/R | Advanced spatial imagination | Formation period |
|---|---|---|
| 1. | 1. Learns to distinguish between the right and left hand.<br>2. They know how to show predictions in the right hand or left hand<br>3. They learn to determine the direction of movement, right, left, top, bottom, front, back concepts. | Childhood. |
| 2. | 1. It can distinguish between right hand or left hand.<br>2. They can move forward and backward, in the directions up and down.<br>3. They can find their place of placement in relation to the prediction.<br>4. Predictions can be replaced by right, left, top, low position. | Preschool age. |
| 3. | 1. They express things around in spatial words such as right, left, back, front, top, bottom, next door.<br>2. Can mark the right, left, top, bottom to draw on a sheet of paper.<br>3. They can correctly change their direction in the process of movement.<br>4. It can suit the placement of things against each other. | School preparation period |
| 4. | 1. Targeting in the phase can prevent itself from being positioned in relation to the predecessor.<br>2. Tries to draw those in his imagination by chameleoning low, high, top on paper<br>3. They can describe not only what they see but also what they hear on paper.<br>4. They can imagine the geometric shape of the surrounding predictions.<br>5. They can compare spatial shapes to predictions.<br>6. They imagine and describe the movement of people on uneven roads, the placement of trees and houses. | School (primary) education. |

This will greatly contribute to the development of a child's spatial imagination, carrying out sequential, gradual activities over four periods of time. Of course, the use of gaming activities in practice at each stage is justified. Play is a tool that helps children to have fun. A good result cannot be achieved by explaining, remembering, and learning independently in the exercise. In each exercise, let the child rejoice, rejoice for learning, rejoice for making it with his own hands, and then he will be remembered for a lifetime.

STEM education, which has been used to develop spatial imaginations in children, provides an opportunity for students to think creatively, expand their imagination and develop design skills. STEM education has a variety of difficulty levels that are consistent with life-styles, vocational orientation of students, pedagogical approaches (observation, conversation, question-and-answer, literature and other sources, can predict project work, data collection and analysis), but includes tasks that delight each child and can delight him for his or her independent work.

The imagination process is always based on basic knowledge. Without imaginations, it will not be possible to make discoveries in science, run companies, create new inventions. In-depth study of STEM education, on the other hand, allows you to create a solid foundation for the formation of a student's personality as an important factor in the development of students' extraordinary imaginations. This technology can be used to prepare engineers, robotics engineers, artists, physicists, geologists, mathematicians and other great professionals.

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