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## **KO‘ZI OJIZ O‘QUVCHILARNING MANTIQIY FIKRLASHINI RIVOJLANTIRISHDA MATEMATIKA FANINING O‘RNI**

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### **Annatatsiya**

Mazkur ish ko‘zi ojiz o‘quvchilarning mantiqiy fikrlashini rivojlantirishda matematika fanining o‘rnini o‘rganishga bag‘ishlangan. Tadqiqotda tiflopedagogika va maxsus pedagogika nuqtai nazaridan matematika darslarining o‘quvchilarning analiz, sintez, taqqoslash, umumlashtirish kabi tafakkur jarayonlarini shakllantirishdagi ahamiyati tahlil qilingan. Ishda ko‘zi ojiz o‘quvchilarga moslashtirilgan o‘quv dasturlari, taktil vositalar, Braille yozuvi, og‘zaki hisoblash va amaliy mashg‘ulotlar orqali mantiqiy fikrlashni rivojlantirish metodlari yoritilgan. Tadqiqot natijalari amaliyotchi pedagoglar va defektologlar uchun metodik tavsiyalar ishlab chiqishga xizmat qiladi.

**Kalit so‘zlar:** ko‘zi ojiz o‘quvchilar, mantiqiy fikrlash, matematika, tiflopedagogika, maxsus pedagogika, taktil vositalar, Braille yozuvi, moslashtirilgan o‘quv dasturi, og‘zaki hisoblash.

### **Аннотация**

Данная работа посвящена изучению роли математики в развитии логического мышления у незрячих учащихся. В исследовании с точки зрения тифлопедагогики и специальной педагогики проанализировано значение уроков математики в формировании мыслительных процессов, таких как анализ, синтез, сравнение и обобщение. Освещены методы развития логического мышления посредством адаптированных учебных программ, тактильных средств, шрифта Брайля, устного счёта и практических занятий. Результаты исследования могут быть использованы для разработки методических рекомендаций для педагогов и тифлопедагогов.



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**Ключевые слова:** незрячие учащиеся, логическое мышление, математика, тифлопедагогика, специальная педагогика, тактильные средства, шрифт Брайля, адаптированная учебная программа, устный счёт.

### Abstract

This study focuses on the role of mathematics in developing logical thinking skills in blind students. From the perspective of typhlopedagogy and special education, it analyzes the importance of mathematics lessons in shaping cognitive processes such as analysis, synthesis, comparison, and generalization. The work highlights methods for fostering logical thinking through adapted curricula, tactile learning tools, Braille, mental calculation, and practical activities. The findings can serve as a basis for methodological recommendations for educators and special education teachers.

**Keywords:** blind students, logical thinking, mathematics, typhlopedagogy, special education, tactile tools, Braille, adapted curriculum, mental calculation.

### Introduction

Mathematics is one of the most effective means of shaping and enhancing human thinking, particularly logical reasoning. For blind students, it is not only a subject for learning calculations and practical skills but also a powerful pedagogical tool for developing essential cognitive processes such as analysis, synthesis, comparison, and generalization. Since students who are visually impaired form their understanding of the surrounding world mainly through hearing, touch, and residual vision, the teaching of mathematics in this context requires the use of tactile materials, Braille, audio-based technologies, mental arithmetic, and practical activities. These approaches not only support knowledge acquisition but also help students develop independent thinking, problem-solving abilities, and the capacity to draw logical conclusions.

The absence of visual perception significantly influences the ways in which blind learners receive, process, and analyze information, making it necessary to rely on preserved sensory channels. Mathematics becomes a crucial medium for fostering mental operations through adapted instructional strategies, specialized teaching aids,



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and multisensory learning experiences. The effective use of tactile diagrams, embossed charts, 3D models, and spatial representations contributes to the expansion of students' mental imagery and spatial awareness, enabling them to understand abstract mathematical concepts in a concrete and accessible manner.

In the context of inclusive education, where blind students often learn alongside their sighted peers, the role of mathematics becomes even more significant. It serves as a bridge for intellectual integration and the development of critical thinking skills that are essential for success across all academic disciplines. This requires teachers to possess high methodological competence, adapt curricula to individual learning needs, and implement innovative pedagogical approaches that directly target the improvement of logical reasoning. Braille-based textbooks, talking calculators, tactile learning tools, and carefully structured oral exercises are among the essential resources that make mathematical learning accessible and meaningful for blind students.

Moreover, problem-based learning and real-life applications of mathematical concepts help strengthen logical thinking by encouraging students to analyze situations, consider alternative solutions, and make reasoned decisions. The integration of mathematics with other subjects such as technology, science, and everyday life situations broadens students' perspectives and reinforces their ability to apply logical reasoning in practical contexts. Collaborative work between teachers, special educators, and parents is also vital, ensuring that the development of logical thinking is consistent and reinforced across both school and home environments.

Ultimately, mathematics for blind students is far more than an academic discipline; it is a foundational tool for intellectual growth, autonomy, and lifelong learning. When taught through adapted methods and accessible resources, it fosters the development of critical cognitive abilities, nurtures problem-solving skills, and empowers students to participate fully in academic and social life. By recognizing and addressing the unique learning needs of blind students, mathematics education can serve as a powerful catalyst for their logical, creative, and personal development.



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