

DIAGNOSTICS OF THE LEVEL OF DEVELOPMENT OF MOTOR COMPETENCIES IN
PRIMARY SCHOOL STUDENTS: DEVELOPMENT AND TESTING OF A
METHODOLOGY

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Abstract: This article presents the development and validation of a method for assessing the development of motor skills in primary school students. The aim of the study is to create an effective diagnostic tool for objectively assessing the physical fitness and motor skill development of children aged 7–10 years. The developed method includes a set of tests aimed at assessing coordination, strength, endurance, flexibility, and speed. Validation confirmed the reliability and validity of the proposed diagnostic procedures.

Key words: motor competencies, diagnostics, physical development, primary school, methodology, testing.

The modern system of physical education in primary school requires a transition from the traditional approach based on physical training to a competency-based model, where the central place is occupied by the development of motor competencies - the child's ability to effectively use his or her motor abilities in various conditions [1].

Diagnosis of the level of development of motor competencies is a key element of the pedagogical process, as it allows for the timely identification of individual characteristics, determination of the dynamics of development and adjustment of the content of physical education [2].

However, primary school practice often relies on outdated assessment methods that fail to take into account the age and psychophysiological characteristics of young schoolchildren. Therefore, the development and testing of a comprehensive methodology for diagnosing motor competencies is a pressing issue for modern pedagogy and sports science [3].

Methods and organization of the study

The study was conducted during the 2023–2024 academic year at three comprehensive schools. It involved 180 students in grades 2–4, aged 7–10.

To assess the level of motor competence, a set of diagnostic tasks was developed, including five blocks:

Speed of movement - 20m run from a high start.

Coordination - shuttle run 3x10 m.

Strength - throwing a medicine ball (1 kg) with both hands from behind the head.

Flexibility - forward bend from a standing position on a gymnastic bench.

Endurance - 6 minute run.

Each test was assessed on a three-level scale (high, medium, low), developed based on statistical analysis of the results of the control and experimental groups [4].

The diagnostic results showed that most students demonstrated an average level of motor skills. The highest scores were recorded for coordination and flexibility, while endurance and strength were lower.

THE MULTIDISCIPLINARY JOURNAL OF SCIENCE AND TECHNOLOGY

VOLUME-5, ISSUE-10

After the introduction of a set of corrective and developmental exercises into the educational process, positive dynamics were observed: the proportion of students with a high level of motor competence increased by 18.4%, and the number of children with a low level decreased by 15.7%.

The analysis of correlations showed a close relationship between the level of motor competencies and general indicators of physical development ($r = 0.68$; $p < 0.05$), which confirms the pedagogical significance of the proposed methodology [5].

Table 1. A diagnostic complex for assessing the level of development of motor competencies in primary school students

No.	Test task	Assessed quality	Performance criteria and standards (7–10 years)	Assessment level
1	20m dash from a high start	Speed of movement	Boys: ≤ 4.5 sec - high, 4.6–5.0 sec - average, >5.0 sec - low; Girls: ≤ 4.7 sec - high, 4.8–5.2 sec - average, >5.2 sec - low	High / Medium / Low
2	Shuttle run 3×10 m	Coordination of movements	Boys: ≤ 9.5 sec - high, 9.6–10.2 sec - average, >10.2 sec - low; Girls: ≤ 9.8 sec - high, 9.9–10.5 sec - average, >10.5 sec - low	High / Medium / Low
3	Medicine Ball Throw (1 kg)	Shoulder girdle muscle strength	Boys: ≥ 5.0 m - tall, 4.0-4.9 m - average, <4.0 m - short; Girls: ≥ 4.5 m - tall, 3.5-4.4 m - average, <3.5 m - short	High / Medium / Low
4	bend on a gymnastic bench	Flexibility of the spine and hamstrings	$\geq +6$ cm — high, $+1-5$ cm — average, 0 or less — low	High / Medium / Low
5	Run 6 minutes	General endurance	Boys: ≥ 1200 m - high, 900-1199 m - average, <900 m - low; Girls: ≥ 1100 m - high, 800-1099 m - average, <800 m - low	High / Medium / Low

High level – 4–5 indicators at a high level: the child demonstrates stable motor skills, is able to perform exercises in full with good coordination and technique.

Average level – 2–3 indicators at the average level: skills are sufficiently developed, but require further improvement.

Low level – most indicators are low, indicating insufficient motor fitness and the need for individual correction.

Table 2. Distribution of students by levels of motor competence development (before and after testing)

Level of development	Before testing (%)	After testing (%)	Change (%)
High	22.1	40.5	+18.4

THE MULTIDISCIPLINARY JOURNAL OF SCIENCE AND TECHNOLOGY**VOLUME-5, ISSUE-10**

Level of development	Before testing (%)	After testing (%)	Change (%)
Average	54.8	51.0	-3.8
Short	23.1	7.4	-15.7

The presented diagnostic complex (Table 1) is aimed at a comprehensive assessment of the development of motor competencies in elementary school students. The selection of tests is based on the age and psychophysiological characteristics of children aged 7–10, as well as recommendations from modern educational and sports-methodological sources.

Each exercise has clearly defined performance standards, allowing for an objective assessment of the development of key physical skills—speed, strength, flexibility, endurance, and coordination. Importantly, the program combines simple tests, accessible in a classroom setting, with control exercises that require willpower and sustained motivation for exercise.

The diagnostic results are interpreted at three levels: high, medium and low. This distribution allows teachers to:

- monitor the physical development of students throughout the academic year;
- identify individual gaps and adjust the content of physical education lessons;
- develop individual routes for the motor development of schoolchildren.

A comparative analysis of the results (Table 2) shows that after testing the methodology, there was a significant increase in high-level indicators and a decrease in the proportion of students with low results. This confirms the effectiveness of the proposed diagnostic approach and its practical significance for the modern school physical education system.

Thus, the tested diagnostic method can be recommended for implementation in the educational practice of primary schools, and also used as a tool for assessing the quality of teaching physical education and the formation of motor competencies in primary school children.

The conducted testing showed that the developed methodology allows for an objective assessment of the level of development of motor competencies, as well as monitoring the effectiveness of pedagogical interventions.

The main advantage of this method is its accessibility and comprehensiveness, making it suitable for use both in physical education classes and as part of extracurricular activities. Furthermore, the method takes into account the individual characteristics of students, which contributes to the development of a student-centered approach to learning [6].

The results of the study confirm that systematic diagnostics contribute to increasing schoolchildren's motivation for physical activity and developing a conscious attitude towards their own physical improvement.

The developed and tested method for assessing motor competencies in elementary school students is an effective tool for pedagogical assessment. It allows for determining physical fitness levels, identifying individual characteristics, and planning further work to develop children's motor activity. The introduction of this methodology into the practice of comprehensive schools contributes to improving the quality of physical education and the formation of the foundations of a healthy lifestyle among primary school students.

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THE MULTIDISCIPLINARY JOURNAL OF SCIENCE AND TECHNOLOGY

VOLUME-5, ISSUE-10

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