Dr. Christian Herrmann
Dr. Harald Seelig

M O B A K - 3

Basic motor competencies in third grade

T E S T M A N U A L

FACULTATIS MEDICINAE BASILIENSIS 1460
UNI BASEL
DSBG
UNIVERSITÄT BASEL
Departement für Sport, Bewegung und Gesundheit

Impressum

Authors:

Dr. Christian Herrmann
Dr. Harald Seelig

Cooperation:

Marina Bacchetta
Prof. Dr. Elke Gramespacher
Ramon Morf
Prof. Dr. Uwe Pühse
Sara Seiler
Dr. Peter Weigel

Layout:

Marina Bacchetta

Sara Baur

Picture credits:

Dr. Christian Herrmann

Logo MOBAK-3:

Dirk Hübner

Edition:

1st edition: April 2015

M O B A K - 3

Basic motor competencies in third grade

Content

T E S T M A N U A L

1 Focus of interest

Educational policy makers question the learning outcomes achieved in each academic subject. Thus, each subject has to provide empirical evidence regarding which competencies need to be achieved by each student at a specific point in time. Educational policy makers and practitioners use this information to justify their decisions (BMBF, 2007). In order to record the effects of physical education, it is necessary to develop assessment instruments that are also valid and practical for this subject. The MOBAK-3 test battery, which measures basic motor competencies in primary school, is an assessment instrument designed for this purpose. While the MOBAK-3 test battery is designed for third graders, the MOBAK-1 test battery was designed to assess first graders (cf. for details Herrmann & Seelig, 2015). In the following, we describe the theoretical background (2), the underlying structure model (3), the development, the execution, and the evaluation of the test items, (4) and the validation study for the MOBAK-3 test battery.

2 Theoretical background

The central task of Physical Education (P.E.) is the qualification of students to actively take part in the culture of sports and exercise. This contributes to the development of a physically active lifestyle. A prerequisite for this is the availability of basic motor competencies (cf. for details Herrmann & Gerlach, 2014).
For instance, there is a broad consensus among subject experts and teachers that all students need to be able to handle a ball safely in order to play ball. It is more difficult for children who do not have these competencies to participate in sports clubs or even play with their classmates on the playground. These practices are an enrichment for most people's cultural lives and an important part of active mobility and a healthy lifestyle (Kurz, Fritz, & Tscherpel, 2008).

People need basic motor competencies in order to ...

... take active part in the culture of sports and exercise.
... experience and understand sports and exercise as enriching their lives.
... be able to make decisions about whether to integrate sports into their own lives (Gogoll, 2012; Kurz, Fritz, & Tscherpel, 2008).

Basic motor competencies can be defined as motor performance dispositions which can be developed from situation-specific requirements and which can serve as an accomplishment strategy for requirements in the culture of sports and exercise.

Basic motor competencies …

... can be learned for the long term, take into account previous experiences, and can be improved through practice.
... are explicitly context-dependent and refer to specific requirements in the culture of sports and exercise.
... are functional performance dispositions which are expressed in behavioral orientation behavior upon accomplishment (cf. Weinert, 2001).

3 Competency structure model

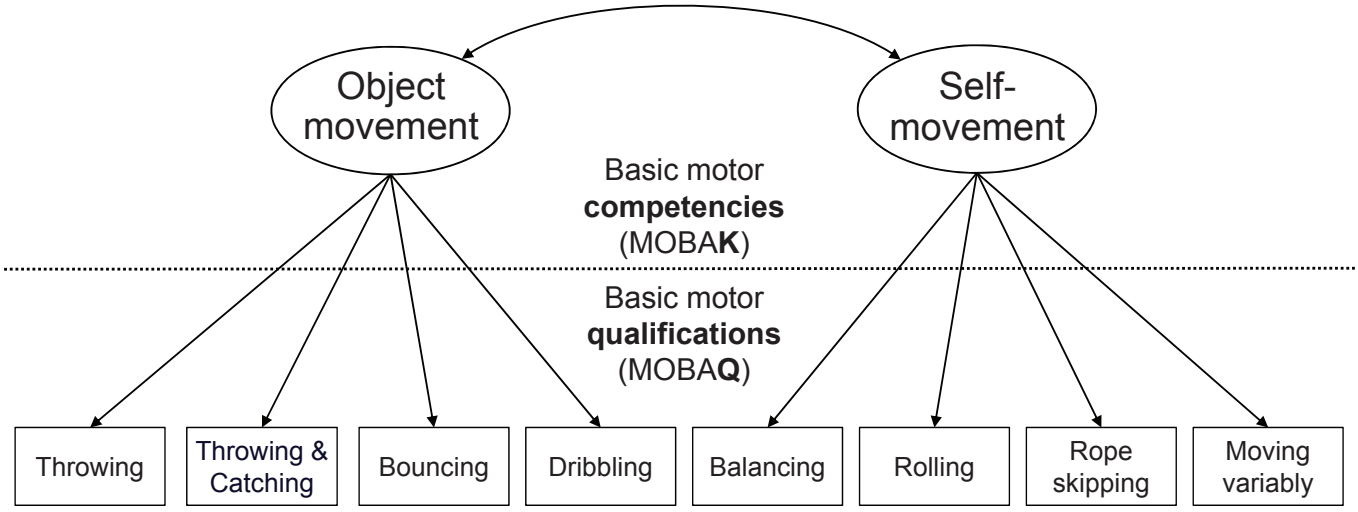
In the construction of the test battery, we differentiate between basic motor competencies (MOBAK), which are not directly observable, and basic motor qualifications (MOBAQ, cf. Kurz et al., 2008), which are observable. Basic motor qualifications (MOBAQ) formulate the educational standards as a can-do statement (e.g., “can throw,” “can catch”) and refer to the performances of students.

Basic motor qualifications are …

... observable performances of athletic activities.
... the basis of learning processes for sport-specific skills and techniques.

Basic motor competencies (MOBAK) are overall performance dispositions based on the observable performance behavior of the basic motor qualifications. The competence structure model (Figure 1) illustrates the relationship between basic motor qualifications and basic motor competencies. This allows the “indirect” acquisition of (latent) basic motor competencies through (manifest) basic motor qualifications (for details see Herrmann & Gerlach, 2014).

Figure 1: Competency structure model of basic motor competencies[1]



[1] This structure model was empirically confirmed by a factor analysis (see Chapter 5). Detailed information on factor values and model fits can be found in Herrmann, Gerlach, and Seelig (2015).

4 MOBAK-3 test battery

4.1 Development of the test items

The test items for the acquisition of basic motor qualifications were developed on the basis of normative pedagogical discussions. The main question was: What should a child at a certain age be able to perform in order to take part in the culture of sports and exercise (Kurz et al., 2008)? The final arrangement of the test battery is the result of a wide selection of potential test items compiled and discussed in several expert discussions[2].
In order to ensure curricular validity, we developed the test items in close connection with the learning goals specified in the curriculum. The criteria for item construction were gender-specific test fairness as well as feasibility and age-appropriate item design. The eight test items are explained in detail in the appendix. These test items measure eight basic motor qualifications which can be assigned to the two basic motor competencies "object movement" and "self-movement" (Figure 1). The assignment in the competence structure model was carried out on the one hand on the empirical level (see Chapter 5) and on the other hand on the basis of the motor development theory by Clark and Metcalfe (2002) as well as the theory of "fundamental movement skills" (overview Burton & Miller, 1998).

1. The *basic motor competency "object movement"* involves the basic motor qualifications "throwing," "throwing & catching," "bouncing," and "dribbling." They are developed from requirements that include handling balls and serve as an accomplishment for requirements in various ball sports.

2. The *basic motor competency "self-movement"* involves the basic motor qualifications "balancing," "rolling," "rope skipping," and "moving variably." They are developed from requirements that include handling the entire body in a room and serve as an accomplishment for requirements in gymnastics or athletics.

These two basic motor competencies are mutually dependent. A jump shot in handball is based not only on competent handling of the ball but also on the coordination of movements made by the entire body.

4.2 Execution of the test items

Each test item is explained and demonstrated by the test leader once.

- *MOBAQ test items "throwing" and "throwing & catching"*
  Each child has six attempts at each test item (no trials). Each hit or passed attempt is recorded. 0–2 hits or passed attempts are assessed with 0 points, 3–4 hits or passed attempts with 1 point, and 5–6 hits or passed attempts with 2 points.

- *MOBAQ test items "bouncing," "dribbling," "balancing," "rolling," "rope skipping," and "moving variably"*
  Each child has two attempts at fulfilling the task (no trials). These test items are dichotomously scaled (0 = failed, 1 = passed). The amount of times passed is recorded (both attempts failed = 0 points, one attempt passed = 1 point, both attempts passed = 2 points). The criteria for passing/failing can be seen in the description of the test items (cf. Tables 1 and 2).

During the development phase, we chose circuit operation as a form of organization. The students were divided into small groups with a test leader for each group. The test leader led the students to each testing station. This form of organization is suitable and economical for scientific purposes. However, it will be difficult to implement this method in P. E. lessons. In school, it would be preferable to implement the various test items in a course in which they are run successively and evaluated immediately, e.g., in the pairs "throwing" and "throwing & catching," "bouncing" and "dribbling," "balancing" and "rolling," and "rope skipping" and "moving variably." This procedure allows students' performances to be evaluated by a single test leader and thus also a single teacher.

[2] The development of the test items follows the cooperation with the FH Northwest Switzerland (the team of E. Gramespacher).

4.3 Evaluation of the test items

The data can be evaluated on the level of MOBAQ test items as well as on the level of MOBAK areas.

- The *MOBAQ test items* can be evaluated separately due to their point scores (0–2 points). It is possible to collect concrete information about each individual student and his or her performance on each test item. Thus, the teacher is able to assess the students' additional educational needs. This also allows teachers to match the teaching content with the children's performance levels.

- *MOBAK-areas "object movement" and "self-movement"*
  The MOBAK areas are calculated as the sum of the results of the four MOBAQ test items (= factor sum value). A maximum total of 8 points can be achieved for each area (4 test items x 2 points):
  "throwing" + "throwing & catching" + "bouncing" + "dribbling" = "object movement" (maximum of 8 points)
  "balancing" + "rolling" + "rope skipping" + "moving variably" = "self-movement" (maximum of 8 points)

The MOBAK areas provide information on a broader range of tasks than the MOBAQ test items. On the basis of the scoring system (0 to 8 points), the level of a student's basic motor competencies can be determined separately. If the measurements are repeated over the course of time, the test battery can be used for the evaluation of P. E. lessons. The differences between the scores in the first and the second test provide information on the change in students' performances over a period of time. By comparing the mean value of the scores for the whole class, one can calculate the average change of the class.

5 Validation study and test fairness

The developed test items have been empirically reviewed in a validation study (N = 323; ♀ = 59%; M = 9.2 years, SD = .39) (for details see Herrmann & Seelig, submitted).

- *Curricular validity:*
  This aspect is fulfilled as a face validity due to the connection to the objective targets formulated in the syllabus.

- *Factorial validity:*
  A two-factor analysis has been explored through factor analysis and has been confirmed with good model fitting for the MOBAK-3 test battery. The first area, "self-movement [or: locomotion]," includes the four test items "balancing," "rolling," "rope skipping," and "moving variably." The second area, "object movement [or: object control]," includes the four test items "bouncing," "dribbling," "throwing & catching," and "throwing." Furthermore, it has been statistically verified that the calculation of a factor sum value (= sum of all items of an area) is acceptable for the calculation of a total value for each MOBAK area.

- *Discriminant validity:*
  The previous validation study for the MOBAK-1 test battery (N = 317; ♀ = 55%; M = 7.0 years, SD = .36) has shown that test items for measuring basic motor qualifications have few correlations with test items for measuring motor abilities (sprint, standing long jump, tapping, jumping sideways). Therefore the MOBAK test batteries target a specific area of motor performance, which has to be distinguished from the test items for measuring motor abilities (in detail Herrmann, Gerlach & Seelig, 2015).

On the basis of these psychometric results, the MOBAK-3 test battery can be accepted as suitable for the evaluation of the effects that P.E. has on basic motor competencies.

The advantages of the MOBAK-3 test battery are …

... curricular, factorial and discriminant validity.
... fast test execution due to practical test items that can be realized with material available in the gym.
... simple evaluation of the test items with dichotomous scales (passed/failed).
... easy calculation of the total value of both MOBAK areas.
... interpretability of the results at the level of single MOBAQ test items.

Literature

- *Main literature:*

Herrmann, C., & Gerlach, E. (2014). Motorische Basiskompetenzen in der Grundschule. Pädagogische Zielentscheidung und Aufgabenentwicklung [Basic motor competencies in primary school. Pedagogical aim decisions and development of tasks]. Sportunterricht, 63 (11), 322–328.

Herrmann, C. & Seelig, H. (2015). MOBAK-1: Basic motor competencies in first grade. Testmanual. Retrieved from www.dsbg4public.ch/custom/upload/docs/bx7gklezunvcv4ziuklmf6446rw60cb1251g.pdf.

Herrmann, C., & Seelig, H. (submitted). Structure and profiles of basic motor competencies in the third grade - validation of a test instrument.

Herrmann, C. (2015). Erfassung motorischer Basiskompetenzen in der dritten Grundschulklasse [Assessment of basic motor competencies in third grade]. Sportunterricht, 64 (3), 72–76.

Herrmann, C., Gerlach, E. & Seelig, H. (2015). Development and Validation of a Test Instrument for the Assessment of Basic Motor Competencies in Primary School. Measurement in Physical Education and Exercise Science, 19 (2), 80–90.

Herrmann, C., Gerlach, E. & Seelig, H. (2015). Motorische Basiskompetenzen in der Grundschule. Begründung, Erfassung und empirische Überprüfung eines Messinstruments [Basic motor competencies in primary school. Explanation, assessment and empirical examination of a test instrument]. Sportwissenschaft..

- *Advanced literature:*

Bundesministerium für Bildung und Forschung. (2007). Rahmenprogramm zur Förderung der empirischen Bildungsforschung [Framework program for promoting empirical education research]. Berlin: BMBF.

Burton, A. W., & Miller, D. E. (1998). Movement skill assessment. Champaign, IL: Human Kinetics.

Clark, J. E., & Metcalfe, J. S. (2002). The mountain of motor development: A metaphor. In J. E. Clark & J. H. Humphrey (Eds.), Motor development. Research & reviews. Reston, VA: National Association for Sport and Physical Education.

Gogoll, A. (2012). Sport- und bewegungskulturelle Kompetenz - ein Modellentwurf für das Fach Sport [Sport and cultural competence – a model for Physical Education]. In A. C. Roth, E. Balz, J. Frohn, & P. Neumann (Eds.), Kompetenzorientiert Sport unterrichten (pp. 39–52). Herzogenrath: Shaker.

Kurz, D., Fritz, T., & Tscherpel, R. (2008). Der MOBAQ-Ansatz als Konzept für Mindeststandards für den Sportunterricht? [Using the MOBAQ approach as a concept for minimum standards for physical education?] In V. Oesterhelt, J. Hofmann, M. Schimanski, M. Scholz, & H. Altenberger (Eds.), Sportpädagogik im Spannungsfeld gesellschaftlicher Erwartungen, wissenschaftlicher Ansprüche und empirischer Befunde (pp. 97–106). Hamburg: Czwalina.

Weinert, F. E. (2001). Vergleichende Leistungsmessungen in Schulen – eine umstrittene Selbstverständlichkeit [Comparative performance measurements in schools – self-evident but controversial]. In F. E. Weinert (Ed.), Leistungsmessungen in Schulen (pp. 17–31). Weinheim: Beltz.

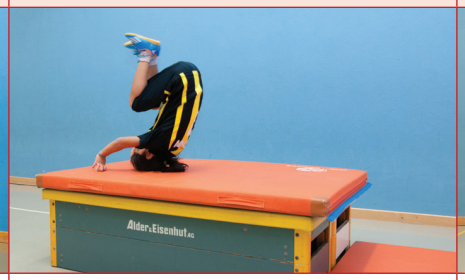
APPENDIX 1

Summary and evaluation table of the test items

TESTMANUAL

--- removable ---

	Object movement			
	Throwing (1)	**Throwing & Catching (2)**	**Bouncing (3)**	**Dribbling (4)**
				
Qualification	Hitting a small target.	Catching a ball while moving.	Bouncing a ball without losing control.	Dribbling a ball without losing control.
Test item	The child throws 6 juggling balls at a target from a distance of 3.0 m.	The child throws a ball in the air behind the first line, follows the ball and catches it behind the second line.	The child bounces a ball from the starting point around the obstacles to the cone and back without losing the ball.	The child dribbles with the ball from the starting point around the obstacles to the cone and back without losing the ball.
Criteria	Hitting the target counts as a point. Overhead throws only. No stepping over the scratch line.	The ball is to be caught when still in the air. While catching, at least one foot has to be on or behind the second line.	The ball can be bounced with two hands. The ball may not be held or lost nor leave the corridor. Obstacles may be touched as long as the flow of movement is not interrupted.	Constant movement. The ball may not be lost nor leave the corridor. Obstacles may be touched as long as the flow of movement is not interrupted.
Evaluation	6 attempts, number of hits is recorded.	6 attempts, number of hits is recorded.	2 attempts, number of successful attempts is recorded.	2 attempts, number of successful attempts is recorded.
Test set-up	A target is placed at a 1.3 m height (lower edge). A scratch line is placed 3.0 m away from the target.	Two lines at a distance of 1.5 m are marked with ground markings, e.g. free-throw line and throw circle.	Marked corridor using tape (7.5 m x 1.4 m). Obstacles 70 cm wide at a distance of each 1.5 m. Cones as end markers.	Marked corridor using tape (7.5 m x 1.4 m). Obstacles 70 cm wide at a distance of each 1.5 m. Cones as end markers.
Materials	• 6 juggling balls • 1 target (diameter: 40 cm) • Tape	• 1 small gymnastic ball (diameter: 17 cm) • Tape	• 1 small basketball (size 3, diameter: 17 cm) • 4 obstacles (8 poles, 4 T-Shirts size L) • 1 cone • Tape	• 1 soccer ball • 4 obstacles (8 poles, 4 T-Shirts size L) • 1 cone • Tape

	Self-movement			
	Balancing (5)	**Rolling (6)**	**Rope skipping (7)**	**Moving variably (8)**
				
Qualification	Balancing across a long bench.	Rolling forward starting with a jump.	Rope skipping on the spot.	Changing direction of movement.
Test item	The child balances across a long bench without leaving it.	The child performs a roll forward starting with a jump onto a pair of vaulting boxes.	The child skips 20 seconds on the spot.	The child follows the markings moving forwards or sideways around the cones.
Criteria	Fluid crossing of the bench without stopping or leaving it. Normal walking (no half steps). Bricks have to be stepped over. Bricks may only be touched on the side.	Jump off with both legs from a standing position. Fluid execution of movement. No rolling off the sides. Landing on the mat or on the boxes (small children).	Continuous rope skipping for 20 seconds without stopping or making a mistake. Method of jumping can be chosen freely.	On the sidelines forward steps, on the diagnoal lines sidesteps. Fluid change between the forms. Fluid forward steps and sidesteps.
Evaluation	2 attempts, number of successful attempts is recorded.	2 attempts, number of successful attempts is recorded.	2 attempts, number of successful attempts is recorded.	2 attempts, number of successful attempts is recorded.
Test set-up	A long bench lays upside down on the floor. Two bricks with the plain side up are taped onto the bench at a distance of 1.0 m from the start and the end.	Two two-piece high vaulting boxes stand alongside each other. One gym mat lays on top and one behind for security.	Skipping ropes are laid out on a free spot.	Four cones build a rectangle (2.0 m x 4.0 m). The short sides and the diagonals are marked with tape.
Materials	• 1 long bench • 2 bricks (ca. 20 cm x 10 cm) • Tape	• 2 two-piece high vaulting boxes • 2 gym mats	• Skipping ropes • Stopwatch	• 4 marking cones • Tape

Evaluation table MOBAK-3 test battery

Area:			Object movement							Self-movement				
Item:			(1) Throwing		(2) Throwing & Catching		(3) Bouncing	(4) Dribbling		(5) Balancing	(6) Rolling	(7) Rope skip-ping	(8) Moving variably	
Trials::			6		6		2	2		2	2	2	2	
Evaluation:			0-2 hits / passed attempts = 0 pts. 3-4 hits / passed attempts = 1 pt. 5-6 hits / passed attempts = 2 pts.				0 passed attempts = 0 pts. 1 passed attempts = 1 pt. 2 passed attempts = 2 pts.			0 passed attempts = 0 pts. 1 passed attempt = 1 pt. 2 passed attempts = 2 pts.				
No.	**Name**	**f/m**	(Hits)	**Pts.**	(passed att-empts)	**Pts.**	**Points**	**Points**	**Total points**	**Points**	**Points**	**Points**	**Points**	**Total points**
Item average:														
Class average:								Object movement:					Self-movement:	

APPENDIX 2

Description of the test items

TESTMANUAL

Additional information is available online at:
www.dsbg4public.ch

Throwing (1)

Test battery	MOBAK-3
Area	Object movement

Qualification	Hitting a small target.
Test item	The child throws 6 juggling balls at a target from a distance of 3.0 m.
Criteria	• Hitting the target counts as a point • Overhead throws only • No stepping over the scratch line
Evaluation	6 attempts, amount of hits is recorded.
Test set-up	A target is placed at a 1.30 m height. A scratch line is placed 3.0 m away from the target.
Materials	• 6 juggling balls • 1 target (diameter: 40 cm) • Tape

Catching & Throwing (2)

Test battery MOBAK-3

Area Object movement

Qualification Catching a ball while moving.

Test item The child throws a ball in the air behind the first line, follows the ball and catches it behind the second line.

Criteria
- The ball is to be caught when still in the air
- While catching, at least one foot has to be on or behind the second line

Evaluation 6 attempts, amount of successful attempts is recorded.

Test set-up Two lines at a distance of 1.5 m are marked with ground markings, e.g. free-throw line and throw circle.

Materials
- 1 small gymnastic ball (diameter: 17 cm)
- Tape

Bouncing (3)

Test battery MOBAK-3

Area Object movement

Qualification Bouncing a ball without losing control.

Test item The child bounces a ball from the starting point around the obstacles to the cone and back without losing the ball.

Criteria

- The ball can be bounced with two hands
- The ball may not be held or lost
- The ball may not leave the corridor
- Touching or overstepping the line is allowed
- Obstacles may be touched as long as the flow of movement is not interrupted

Evaluation 2 attempts, amount of successful attempts is recorded.

Test set-up Marked corridor using tape (7.5 m x 1.4 m). The obstacles are 70 cm wide at a distance of 1.5 m each. Cones are used as end markers.

Materials

- 1 small basketball (size 3, diameter: 17cm)
- 4 obstacles (8 poles, 4 T-Shirts size L)
- 1 cone
- Tape

Dribbling (4)

Test battery MOBAK-3

Area Object movement

Qualification Dribbling a ball without losing control.

Test item The child dribbles with the ball from the starting point around the obstacles to the cone and back without losing the ball.

Criteria

- Constant movement
- The ball may not be lost
- The ball may not leave the corridor
- Touching or overstepping the line is allowed
- Obstacles may be touched as long as the flow of movement is not interrupted

Evaluation 2 attempts, amount of successful attempts is recorded.

Test set-up Marked corridor using tape (7.5 m x 1.4 m). The obstacles are 70 cm wide at a distance of each 1.5 m. Cones are used as end markers.

Materials

- 1 soccer ball
- 4 obstacles (8 poles, 4 T-Shirts size L)
- 1 cone
- Tape

Balancing (5)

Test battery MOBAK-3
Area Self-movement

Qualification Balancing across a long bench.

Test item The child balances across a long bench without leaving it.

Criteria
- Fluid crossing of the bench without stopping or leaving it
- Normal walking (no half steps)
- Bricks have to be stepped over
- Bricks may only be touched on the side

Evaluation 2 attempts, amount of successful attempts is recorded.

Test set-up A long bench lays upside down on the floor. Two bricks with the plain side up are taped onto the bench at a distance of 1.0 m from the start and the end.

Materials
- 1 long bench
- 2 bricks (ca. 20 cm x 10 cm)
- Tape

Rolling (6)

Test battery MOBAK-3

Area Self-movement

Qualification Rolling forward starting with a jump.

Test item The child performs a forward roll starting with a jump onto a pair of vaulting boxes.

Criteria
- Jump off with both legs from a standing position
- Fluid execution of movement
- No rolling off the sides or the shoulders
- Landing on the mat or on the boxes (small children)

Evaluation 2 attempts, amount of successful attempts is recorded.

Test set-up Two two-piece high vaulting boxes stand alongside each other. One gym mat lays on top and one behind the boxes for security.

Materials
- 2 two-piece high vaulting boxes
- 2 gymnastics mats

Rope skipping (7)

Test battery	MOBAK-3
Area	Self-movement

Qualification	Rope skipping on the spot.
Test item	The child skips 20 seconds on the spot.
Criteria	• Continuous rope skipping for 20 seconds • Rope skipping without stopping or making a mistake • Method of jumping can be chosen freely
Evaluation	2 attempts, amount of successful attempts is recorded.
Test set-up	Skipping ropes are laid out on a free spot.
Materials	• Skipping ropes • Stopwatch

Moving variably (8)

Test battery MOBAK-3

Area Self-movement

Qualification Changing direction of movement.

Test item The child follows the markings by moving forward or sideways around the cones.

Criteria
- On the sidelines forward steps, on the diagnoal lines sidesteps
- Fluid change between the forms
- Fluid forward steps and sidesteps
- Viewing direction remains the same during the whole task

Evaluation 2 attempts, amount of successful attempts is recorded.

Test set-up Four cones build a rectangle (2.0 m x 4.0 m). The short sides and the diagonals are marked with tape.

Materials
- 4 marking cones
- Tape

Contact

Dr. Christian Herrmann

Department of Sport, Exercise and Health
University of Basel
Birsstrasse 320 B
CH-4052 Basel
Switzerland

Phone: 0041 61 377 87 81
Fax: 0041 61 377 87 89
E-Mail: christian.herrmann@unibas.ch
Homepages: www.dsbg4public.ch / www.dsbg.unibas.ch