

MATH ASSESSMENT LEAFLET (MATLE)

What is it?

The Math assessment leaflet (MATLE) has been developed for a

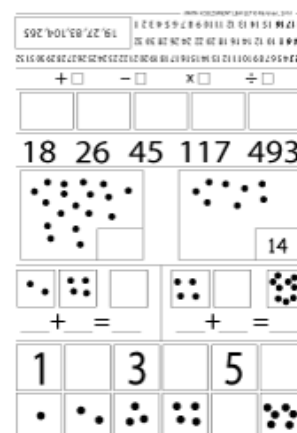
- quick,
- structured,
- qualitative,
- individual

assessment of children's basic numerical skills.

To whom is it?

The MATLE is a tool for special needs education teachers.

Teacher's can use it to guide their assessment of children with special needs in mathematics education or with broader cognitive disabilities.



What does it contain?

The MATLE contains only tasks, which measure the basic number skills. It does not give tools to directly assess child's success in school mathematics.

Why to use?

Numeracy is a vital part of basic skills required in the modern world.

Numeracy enables active participation in the society, supports persons possibilities to be an independent, productive and responsible member of the society.

A failure to learn basic number skills causes lowered self-esteem, anxiety and frustration during math classes, and hinders person's possibilities to acquire vocational education. Basic number skills are needed in every day life (clock, money, counting, comparing, communicating).

The form of assessment

The MATLE was developed to guide individual assessment. It is not structured in the same way as standardised tests are, but it works as a guideline for a thorough interview with a child. You can freely adjust the instructions and how you use it depending on each child's special needs and skills. You can also stop the assessment where ever you find out that the tasks have become too difficult for the child.

The tasks

The MATLE consists of nine tasks.

1. One to one correspondence
2. Numbers from 1 to 6
3. Understanding the principles of addition and subtraction
4. Verbal counting
5. Estimating and counting objects
6. Reading larger numbers
7. Producing larger number
8. Understanding arithmetic symbols (+, -, x, ÷ signs)
9. Addition, subtraction, multiplication and division

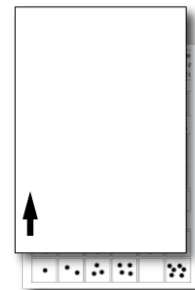
Tools required

Child: a pencil

Teacher: a pen, the assessment leaflet, an empty A4 paper.

How to use?

Follow the order of these instructions. Use an empty A4 paper to uncover the task items one by one to ensure that the child's attention will be directed to the task at hand.

**Instructions**

You can freely modify these instructions to fit the developmental age of the child and the special communicatory needs of the child.

1. One to one correspondence

There are dots printed from 1 to 6 (value 5 missing). Ask the child does he/she know how many dots there are (ask the child to give a number name). You can also ask the child to show the same number with his/her own fingers. Ask the child how many dots there should be in the empty box. If child answers correctly, ask the child to draw the correct number of dots. If the child answers incorrectly, study together the previous boxes and show the child that there should always be one more. After the explanation, ask the child to draw the correct number of dots inside the box, and ask the child whether he/she knows the name of the number.

2. Numbers from 1 to 6

Above the boxes with dots there are numbers 1 3 and 5 (2, 4 and 6 missing). Ask the child to name those numbers. Then ask the child to draw the number, which corresponds to the amount in the box (**). Preferably, do not say the name of number aloud, but ask the child, what is the number he/she should write. In a similar fashion, ask the child to produce numbers 4 and 6.

3. Understanding the principles of addition and subtraction

There are two addition tasks. The first is within the range of the numbers just analysed ($2+4=$ ___). Ask the child to say how many dots there are in both boxes and whether the child knows how much they are together, and ask him/her to draw the same number of dots to the answer box. Then ask if the child can write down the same task as numbers.

The second addition task $4 + \text{_____} = 9$ requires the child to understand the inverse relation between addition and subtraction ($x + y = z \Leftrightarrow y = z - x \Leftrightarrow x = z - y$). If the child solved the first task easily, you can ask the child to try to solve the second task without any guidance. However, if the child had difficulties with the first task or the child does not know how to proceed with the second task, you can explain the task step-by-step. Ask first what are the quantities (4 and 9; if incorrect ask the child to recount the dots till correct). Then ask the child to write them down as numbers. Verbalise the task to the child by asking, that if you have four, how much do you need to add to get nine. If the child still cannot solve the task, guide the child to try to solve the task with his/her own fingers, or if that is difficult because of fine motor problems, you can give you fingers or some other concrete material to child to be used.

4. Verbal counting

Take the leaflet in your hands. Ask the child to count as far as he/she can. If needed you can start 1, 2, 3 to help the child. You can also mark counting errors with your own pen. If the child reaches 32, you can stop and give positive feedback. If the child makes many errors, you can ask the child to do it again.

If the child can do the first task, you can continue to the next sequence. Ask the child does he/she know what are odd and even numbers. If the child does not know, explain what even numbers are (even numbers are made of pairs). Ask the child to count with even numbers. Explain that he/she needs to say aloud every other number. You can start yourself saying 2, 4, 6. Stop if the child reaches 32.

Again you can mark down errors the child committed. If the child makes many errors, you can ask the child to try again.

The third counting task is counting backwards. Ask the child to count down from 15. You can start first (by saying 18, 17, 16).

5. Estimating and counting objects

Show the child the box where there is a lot of dots. Ask the child first to guess how many there is. After that ask the child to check how many there is and to write down the number.

In the second task explain the child that there should be 14 dots. Ask the child whether he/she thinks there are a correct number of dots. If the child says yes, ask him/her to check the real number of dots. Next ask the child to draw as many dots as needed, so that there would be 14 dots.

6. Reading larger numbers

Ask the child to name the numbers written on the leaflet (18, 26, 45, 117, 493).

7. Producing larger number

Ask the child to write with Arabic numbers the numbers you say to the empty boxes (19, 27, 83, 104, 265). Say the numbers one-by-one and let the child to write the answer before proceeding to the next number.

If the child gets those numbers correct, then you can turn the page around and ask the child to write down as large number as he/she can give a name. If the child does not know what to do, you can help him/her by asking do you know how to write, e.g. "one thousand", "thirty thousand", "two hundred thousand", "one million".

8. Understanding arithmetic symbols (+, -, x, ÷ signs)

Ask the child whether he/she knows what do the arithmetic symbols (+, -, x, ÷) mean. Ask the child to give an example task. If the child can give a mathematical example (e.g. three plus two is five), then ask if the child can give an example from the every day life where such arithmetic operation could be used.

9. Addition, subtraction, multiplication and division

Turn around the paper. You will use the empty side of the paper in this task. Give the child a pencil and you will use a pen in this task (so that you can later

recall which numbers were written by the child and which were written by you). Use only those arithmetic operations the child was able to explain in the previous task.

Start from addition. Ask the child to write an addition task for you to be solved. Tell him/her that the task should be as difficult as possible, but it should be a task which answer he/she knows. When he/she has written the task, tell the child that now you will try to solve it. If you think the child knows the answer, you will write the correct answer and ask the child to check whether you did it correctly. If you think that the child does not know the answer or that the child is uncertain about the correct answer, you can write an incorrect answer (the incorrect answer can be very far away from the correct one) and ask the child to check whether you were able to solve it. If the child says you were incorrect, ask the child why he/she thinks you were incorrect and ask the child to explain how the task should be calculated correctly.

Next tell the child that now it is your turn to give a task. If the child was able to do the first task, give a little harder task, and if the child struggled with the previous task, give an easier task.

Continue in a similar fashion by doing calculation tasks by turns till you have a rough understanding about the child's arithmetic skills. If needed you can continue doing tasks to the empty additional paper you have.

Go through all the arithmetic operations the child was able to explain in the previous task.

Notes

After you have finished the assessment write down your evaluation of the child's assessment.

Write down your observations on child's strengths and weaknesses in

- Number skills,
- Other skills
 - E.g. language
 - Vocabulary and word finding
 - Grammar (sentence structure)
 - Articulation
 - Skills to express thoughts
 - Fine motor skills (grip and motor production)
 - Visual attention, visuo-spatial skills
- The child's behaviour during the assessment
 - Concentration,
 - Attention,
 - Communication,
 - Interaction
 - Motivation, refusals
 - General mood