

Specific needs in mathematics

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- 75% presence
- At the end of the course (in the last seminar), students will pass short oral exam which will consist of theoretical and practical question.

Conditions of the course

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- Materials available in IS

Literature

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- Placing children with SLD into specially oriented schools or classes;
- Inclusive education;
- In the past, the problem of SLD was not paid much attention to;
- Specific learning difficulties are usually defined as the inability of an individual of average intelligence, having suitable socio-cultural opportunities, to learn, write and calculate through the generally used teaching methods.

Specific learning disabilities

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- According to our research, at primary school there are 16 % of diagnosed specific learning disabilities.
- There are 1 – 2 % pupils with dyscalculia.
- The pupils' problems in mathematics could be of different reasons (minimal brain dysfunction, the improper way of teaching, the negative attitude to mathematics, the distaste for work, etc.)

Experience

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- **Dyslexia** – the disability can affect distinguishing individual letter, the speed of reading, the correctness of reading, or understanding the read text.
- **Dysgraphia** – the disorder affects acquiring individual letters, links sound-letter, layout of the writing.

Classification of SLD

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- **Dysortographia** – the disorder of spelling
- **Dyscalculia** – the disorder affects mainly forming mathematical concepts, problems connected with operations with numbers, disorder of spatial skills, etc. The deficit concerns mastery of basic computational skills of addition, subtraction, multiplication, and division rather than of the more abstract mathematical skills.

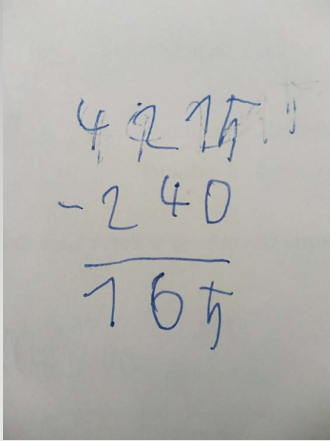
Classification

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- **Natural numbers, understanding the notion**
 - The notion of a natural number has to be formed on the certain level of abstraction, otherwise we meet various problems.
- **Reading and writing figures**
 - Problems with writing figures
 - Problems with writing more digit numbers

Pupils' problems in certain subject-matters

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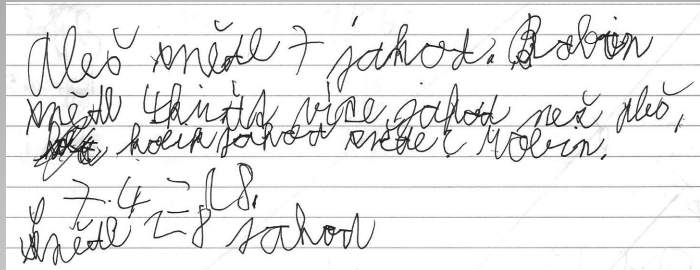


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Pupil with dysgraphia

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Ales měl 7 jahod. Robin
měl čtyřikrát více jahod než Ales,
~~ale~~ jaké jahody měl Robin.
7 · 4 = 28
měl 28 jahod

Ales ate 7 strawberries. Robin ate 4 times
more strawberries than Ales. How many
Strawberries ate robin.
 $7 \cdot 4 = 28$
He ate 28 strawberries.

Pupil with dysgraphia

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- Understanding the correct shape of the figure – using the sense of touch and visual imagination (modeling from the wire, into the sand)
- Use bundles of sticks or straws by tens and units
- Use cards with several orders
- Work with natural number progression

Remedial procedures

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Experiences from lessons

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Experiences from lessons

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- Remedial procedure by working with the teaching aid Bank



Remedial procedures

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- **Adding natural numbers**
- The operation addition of natural numbers is derived on the basis of the union of two groups of objects, which we put together.
- We start from the manipulative activities with real objects.
- Later on, children must master **mental addition** (first in the set up to five, later in the set up to ten).

Operations with natural numbers

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- Decomposition of the number 10 and of other numbers is essential in teaching adding in Chinese schools.



Decomposition of the number 10

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- **Addition with crossing the boundary of ten**
- One of possibilities is the decomposition of the second addend so that we fill up the first addend to ten.
- Children have to automate decompositions of the number 10.
- Children can count with beads.
- The teaching aid **The Snake game** is very helpful.

Operations with natural numbers

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- **The Snake game**



Remedial procedures

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- The **written addition** differs from the mental addition by the fact that while adding mentally we usually start from the highest orders, but while adding in writing we start from the units.
- The **written addition algorithm** is derived on the double-digit numbers and is then generalized.
- We can derive the algorithm on the Bank teaching aid.

Written addition

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- In the school mathematics, **subtraction** is derived as a dynamic operation which is connected with taking away, decreasing, separating etc.
- We start from manipulative activities with real objects.
- We can represent the situation in pictures. We cross out several objects in the picture.

Subtracting natural numbers

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- Further activities are analogous to the addition: mental subtraction in the set up to 5, up to 10, subtraction with crossing the boundary of 10, subtraction in the set up to 100, written subtraction.
- Decompositions of minuend or subtrahend.
- It is not very useful when children subtract by one with showing on fingers because the count e.g. $12-4$ as follows: 12, 11, 10, 9.

Subtracting natural numbers

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- Not understand the operation subtraction at all.
- Problems with subtracting by one.
- They count with figures of different orders (e.g. $80-6=20$, $64-40=60$, $45-3=12$)
- They always subtract the lesser number from the greater one (e.g. $62-28=46$)

Problems at the mental subtraction

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- The **written subtraction algorithm** is derived primarily for double-digit numbers and then it is generalized for numbers with more digits.
- In textbooks it is possible to find two different procedures of deriving the written subtraction, either by “counting up” (5 plus how much is 8?) or by subtracting from the top ($8-5=$).

Written subtraction

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- It is not convenient to apply the procedure of subtracting from the top, because while subtracting with crossing the boundary of 10 there would appear mistakes, when children would always subtract the lesser number from the larger one (e.g. $62-28=46$).
- For deriving of written subtracting or remedial procedures, we can use the Bank.

Written subtraction

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