



Education and Culture DG

Lifelong Learning Programme

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# Improving literacy and numeracy skills

Comenius project 2010 – 2012

The UK's Department for Children, Schools and Families defines **numeracy** in their *National Strategy* documents as follows:

Numeracy is a proficiency which is developed mainly in mathematics, but also in other subjects. It is more than an ability to do basic arithmetic. It involves developing confidence and competence with numbers and measures. It requires understanding of the number system, a repertoire of mathematical techniques, and an inclination and ability to solve quantitative or spatial problems in a range of contexts. Numeracy also demands understanding of the ways in which data are gathered by counting and measuring, and presented in graphs, diagrams, charts and tables.

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## Why Numeracy?

International studies of educational achievement such as PISA and TIMSS has made us aware that many of our pupils are performing significantly below average in the OECD area both in literacy, numeracy and science. This has led to an increased focus on learning outcomes and attempts to develop better teaching strategies. This is visible in many municipalities both through local systems for assessment and different programmes for early intervention, especially focused on literacy and numeracy.

Between the mobilities we have local literacy and numeracy weeks in every project school in order to improve the schools' approaches and methods in literacy and numeracy education. In this number of our newsletter we focus the good practices in the different schools for improving their numeracy skills. The numeracy week in November 2011 was corresponding to our application where we can find two of our objectives:

*(...) to develop school strategies for improving*

*numeracy skills based on good practices in all participating schools (...)* to achieve better learning outcomes for the pupils in a long term perspective.

The local results and identification of good practices from all schools will form the basis for development of the schools' strategies to improve numeracy skills. One of the main goals in our project is to improve teaching methods, assessments and plans for teaching numeracy in all participating schools. Let us hope the numeracy week has inspired us to develop better teaching strategies for the children.

Arnstein Naerlie





**What is numeracy ?**

- Numeracy can be described as:
- knowing about numbers and number operations
  - having the skills and the ability to solve numerical operations in a variety of contexts
  - familiarity with handling numerical and graphical information

**Why is numeracy important?**

Numeracy is a lifeskill. Proficiency in the basic skills of numeracy is not enough: what is needed is the ability to apply these skills to real-life practical problems. For example:

- Developing financial competency
- The increased need to make complex financial arrangements
- Financial awareness to prevent debt and exploitation
- Young people being aware of their rights in part time employment

- and reasoning using correct mathematical terms
- Judging whether their answers are reasonable and having strategies for checking them where necessary
- Suggesting suitable units for measuring, and making sensible estimates of measurements
- Explaining and making predictions from the numbers in graphs, diagrams, charts and tables

**What is effective practice?**

The factors which promote high standards in numeracy need to be considered in the contexts of:

- Management
- Curriculum and assessment
- Teaching
- Learning
- Literacy links
- Partnerships approaches
- Quality assurance

<http://www.stirling.gov.uk/cfnumeracy3numeracyforallpolicyguidelines.doc>

*“Numeracy is a lifeskill.”*



**First grade** > Using numbers to make a clock

**What can young people achieve:**

- Effective learning and teaching focus on:
- identifying and using numbers in counting games, songs, rhymes and during play
- Having a sense of the size of number and where it fits into the number system

Knowing by heart number facts such as number bonds, multiplication tables, doubles and halves

Calculating accurately and efficiently, both mentally and with pencil and paper, drawing on a range of calculation strategies

Recognising when it is appropriate to use a calculator and being able to do so effectively

Making sense of number problems, including non-routine problems, and recognising the operations needed to solve them

Explaining their methods



**Pupils from 2nd grade playing Monopoly**  
It use the monetary units by creating real or imagined construction of situations in which children can decide if they can buy one or more objects with a sum of money



**Pupils from 2nd grade playing Shopping**  
It use the monetary units by creating real or imagined construction of situations in which children can decide if they can buy one or more objects with a sum of money



**First grade: Pupils playing The envelope game** > It exercise 1-6 numeracy and operations of addition and decrease



## Maths Day on Thursday the 17<sup>th</sup> of November at Tølløse Centralskole.

For several years the physical education teachers at Tølløse Centralskole have represented the school in the project SundSkoleNettet (Healthy School Network). This national network focuses on making health initiatives in public schools and collecting data about the health of Danish pupils. The initiative was started in 2008 by the Rockwool Fund from a wish to prevent a negative lifestyle development and the following lifestyle diseases.

The pivot of the “Healthy School Network” is a yearly measurement of the pupils’ weight, height, BMI, waistline, jumping height, fitness and pedometry. These results are uploaded to a shared database. Pupils together with their parents can use the data to follow the pupil’s health. Likewise the school can follow the school’s overall state of health.

A secondary aim of the initiative is to gather knowledge which politicians can use to make informed decisions about child health.

So it seemed obvious to sign the entire school up for “Maths Day”, Thursday the 17<sup>th</sup> of November, since the theme this year was “Healthy Math”.

The pupils’ associated health with their own experiences in a mathematical way. They also had a chance to use math as a tool to treat problems associated with daily life and the development of society.



“Third grade; how long is a step?”

This day’s work helped the pupils’ becoming aware and getting some understanding of the concept of health. This helps them making critical decisions and act to promote their own and other’s health.



200 meters race

A couple of examples from the event:

- The 3<sup>rd</sup> grade pupils had already used step counters, as part of the “Healthy School Network” project, and registered how many steps they walked each day. So naturally one exercise was: “How long is a step and is it constant?” The pupils measured two routes, one on a flat surface and another up a hillside. Afterwards walked the two routes while counting the number of steps they used.

Lastly they calculated their step length (step length = distance / number of steps).

Through this exercise the pupils discovered, both on their body and using math, that step length varies with the terrain.



First grade making records

- Several classes participated in a countrywide competition where everybody had to perform a 200 meters race. After the race they had to crunch the numbers (calculating average time for all/boys/girls). Lastly the class had to guess what the average time would be for all pupils their grade across the country. Afterwards the different grades worked on other Sports subjects.

- 1<sup>st</sup> grade chose to work with records and making their own book of records.



## Numeracy and Literacy activities from Grundschule

### Math competition of the 4<sup>th</sup> graders

In October there was a math competition in between all of the 83 4<sup>th</sup> graders of our school. The main topic was logical thinking. Many pupils of our school achieved very good results. The winners of the 13 participating schools were allowed to go to the competition on county-level in November. David, our school champion became the county champion, too. He is now qualified for the district competition in December.



*«It seems very important to take each pupil as an individual [...]»*

### Mentoring of the first graders:

In order to make the first steps in everyday schoolwork easier, every first class was appointed a guiding class with the beginning of this school year. To begin with the fourth graders showed the first graders around the school building. During a German lesson they then read books to them. For the fourth graders it was a motivation to try especially hard whilst reading, for the first graders it gave the motivation to also reach this goal in class.



### Cartoon production by the class 3b:

In the context of creative writing a cartoon was developed in July 2011. Its development proceeded in the following way:



At first every pupil thought of one word which should play an important role for him or her in the story. This word was written on a card and hung up on the black board. In the following class conversation ten of these words were

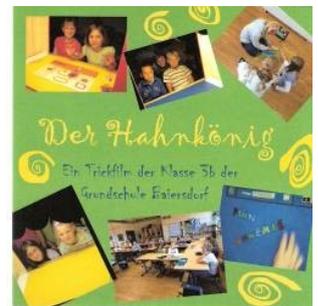
chosen by the pupils, which should play the main parts in the story.

In teamwork the story line was formed, it just happened to be a fairy tale.

Now the background pictures, the props and the main



characters had to be painted. After that the audio recordings, the opening credits (with gummy bears) and the credits were shot. Finally the background music was edited.



### Book boxes:

This year the Baiersdorf primary school was once again given book boxes, which were provided by the Baiersdorf library "Bücher-Bienchen" for a reading-aid program by the publisher Oettinger and Ravensburger. Every grade received two book boxes, which were individually adjusted to each of them. The book boxes are kept in each class for four weeks, then they are passed on to a parallel class. With the help of reading-diaries the pupils can evaluate already read books and recommend them to other pupils.

Sabine Bartsch





Ringsaker kommune



## Math stairs in Mørkved school, Norway

### Mathematic days 7<sup>th</sup> grade November 2011.

In this newsletter we choose to present for you the work done by our 7<sup>th</sup> grade. We will show you some elements of their work in May 2012 as well.

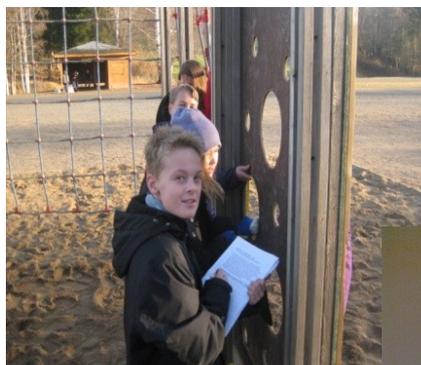
The pupils in 7<sup>th</sup> grade works normally after a model called Math Stairs. The students are tested in the beginning of each topic and are divided into level groups according to the test results. These math days were organized in 12 stations where various topics were represented, and the students worked in groups. This was a combination of repetition and experience to expand the mathematical understanding. We emphasized the great variety of tasks, which represented theme like measurement, geometry, numeracy, the four main math topics, calculation, the use of calculator, problem solving and guided reading. Some of the tasks were designed as games. We had



What weighs the object?

set aside two days, where we worked only with mathematic. The students were divided into six inside groups and six outside groups. At each station where they worked for 30 minutes they met an instruction of what to do. The task was to carry out activities and respond correctly. The last 5 minutes they should write about what they had learned. The students liked working with math in this way. They found the activities very motivating and they were inspired by the different topics.

Here you can see **some examples**:



We learn about circles

*«[...]The students liked working with math in this way.»*



What does a dinner cost?



The magic T



Liters, deciliters etc



Find the primes.



SCHOOLS



Independența

## Numeracy week in Schools no.1&2 Independența

There was a time when those individuals who struggled with maths and numbers were considered stupid. It didn't matter what other skills these pupils possessed, those who could master maths simply didn't understand the problem and were quick to apply a label. Many of the students, challenged by numeracy issues, will feel stressed in their mathematics lessons. A lot of students have spent years in school in maths classes not being able to understand the meaning and or concepts of the words and vocabulary. As a result words and language forms create stress and negative feelings and reactions for the pupil such as:

sums, division, subtraction etc.

For that we organised Numeracy week so that our students can discover Mathematics "different".

During Numeracy week (21<sup>st</sup>- 25<sup>th</sup>

Of November), the

**First grades** repeated the

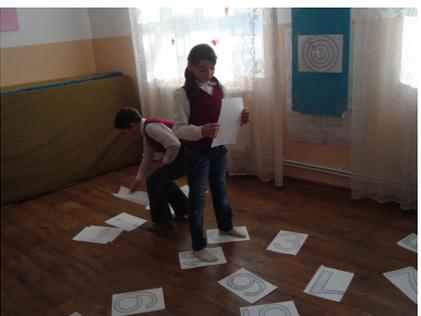
numbers 0 -9 by making puzzles, modeling plasticine or making collages of crepe paper, then ordering ascending and descending the numbers obtained. The second activity was the development of group games: *Monopoly*, *Do you mind brother*, *In the land of Piticot* or movement games: the *hopscotch* and the *envelope*. Through these games the



1<sup>st</sup> grade: the Hopscotch



1<sup>st</sup> grade: making Puzzle



Pupils of the 3<sup>th</sup> grade: Twister game

students practiced the 0-9 numeracy. The **Second grades** exercised mathematical operations with numbers from 0 to 100 through group games like: *Don't be mad, brother!*, *Monopoly*; also, they played logical- mathematical games: *Piticot-counting*

game in order to understand the decimal system of numbers (in hundreds, tens and units) using objects for justification. Through role



game *Shopping*, the 2<sup>nd</sup> grade: *Monopoly game*

used monetary units creating imagined or real construction of situations in which children can decide if they can buy one or more objects with a sum of money. **Third grades** performed operations of addition and reduction numbers less

than 10,000 without crossing order and with crossing order playing team games such as *Twister*, the *Target drawing*, *Bingo* or group games: *Monopoly*;



they also used role play *Shopping*, 3<sup>th</sup> grade: *Bingo*

practicing the role of buyer and seller, using real money. Pupils from **Forth grades** played also the role game *Shoping*, as seller and buyer; they organised mathematical- logic games



4<sup>th</sup> grade: Sport and Math

championships and team games, combining sport with math in order to perform multiplication and division operations the rest with

natural numbers.

Students enthusiastically participated in these activities. They played learning and also learned playing.



4<sup>th</sup> grade: Seller and buyer



## Activities in the mathematical week in Primary School Kapela

We work and cooperate in a common European project for more than a year and a half. In November we performed a mathematical week. Activities were planned and carried out by the teachers during regular classes or we performed a special day for activities that were aiming towards developing mathematical literacy. Most of



Pupils of the 5<sup>th</sup> class are measuring long jump and writing down the results

eracy through cross-curricular activities and use of mathematical content in their own subject fields (for example. Music – music values, Art – pattern marking of graphical sheet, Chemistry –



Pupils of the 5<sup>th</sup> class are using music values

Although, first class pupils are just starting to get to know the numbers, they were very enthusiastic about the game Bingo. Tatjana Perša, a teacher in the second class prepared various activities for her pupils in the mathematical week. In subject Learning about the environment pupils were noting down the temperature in their home town at different parts of the day, then

wrote the temperatures into the chart and represented the data graphically. In P.E. pupils were practicing aiming of different targets and noting down the hits in charts, survey of hits in graphs. In Maths pupils were practising calculating with money by roleplaying visitation of different institutions in town. In that way they were getting

used to the usage of money in everyday situations (buying, selling, exchanging). For that purpose they prepared a ‘town’ with different institutions in their own classroom. In Slovene class pupils made signs (for example HAIRDRESSER, BANK, POST OFFICE, BOOK SHOOP), in Art they draw shop windows and pictograms for these institutions. Every pupil prepared his own price list for products and services that he was offering. Through role play pupils were getting used to the practical usage of money in everyday situations, at the same time they were practising addition, subtraction up to 20. Pupils of the 4<sup>th</sup> class realised that cube and square stone are two geometrical bodies that we often come across in real life.

Teacher Nina Godec Meško and pupils of the 5<sup>th</sup> class performed activities in Maths and P.E. In Maths pupils were solving mathematical problems in text exercises that were dealing with geometrical shapes (straight line, circular line, circle). In P.E. pupils used their mathematical knowledge. They were working independently in groups. In first group they have to read the instructions that said what the size of the drawn circle is, what is the distance of the circle from the floor and

what is the distance from the circle to the pupil that is throwing

a ball. Then pupils draw

a circle line and measure the distance of the throw into the circle line. They used geometrical tools independently. In the second group pupils measured how far they long jumped from the site. First they prepared what they needed and chose a writer. The writer had to measure the jumps and write down the results. The other pupils were paying attention on the accuracy of the jumps and they reported the length of the jump to the writer. In that way they measured, read the data and wrote the data in the correct measuring number and unit.

Teacher Marija Andrejč planned and performed a day of activities together with Angela Stajnko, the teacher of physics, technology and science for students of 6<sup>th</sup> and 7<sup>th</sup> class. Pupils were working in different workshops which all had the same goal: usage of mathematical knowledge in solving tasks of everyday life. Pupils very highly motivated and were surprised at the outcome for certain results (for example the percentage of saved space with pressed packaging, estimation of the volume of some bottles can be very deceptive, ..).



Pupils of the 2<sup>nd</sup> class are writing mathematical data graphically.



Pupils of the 7<sup>th</sup> class are measuring the volume of different bottles

## Staff team



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**We're on the web!**

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