

Good Morning, Numbers Day

Motivating For Mathematics



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RAMÉNTOL describes

a project called

"Numbers Day" that

was designed to

improve students

attitudes toward

mathematics. There

are many features

of Numbers Day

that teachers might

incorporate into their

own maths activity

days.

The aversion that many girls and boys experience towards mathematics has been one of my major concerns since I started teaching and to this end I helped to create Numbers Day. The first Numbers Day was held on 29 February 1984. The experience was so successful that it continues to be held nationwide and is currently expanding worldwide. This activity is held every year and we have gathered a great deal of information about the event. We eventually decided to quantify this experience in a research project carried out over two academic years in two centres; one where Numbers Day was held, and another where this was not the case, in order to compare the results.

The following activity is used every year with the students of Didactics of Mathematics in the School of Education at the International University of Catalonia. We are really aiming for the school pupils to be competent in mathematics. In accordance with my current line of investigation we have undertaken a study of the didactics of mathematics in Catalonia.

Objectives

The main objective of the experience was very clear: to improve motivation towards mathematics so as to get students and teachers enjoying learning and teaching mathematics.

There are also further related objectives, namely:

- to raise students' awareness of the use of mathematics in our daily lives;
- to strengthen group dynamics and integration of children with learning difficulties;
- to help students organise themselves and take responsibility for the control and development of games and foster self-regulation of results and rules;
- to stimulate creativity by designing new games, some of which were indeed original and challenging;
- to raise student interest in numerical curiosities;
- to take a cross-curricular approach to the games and involve every member of the teaching staff;
- to improve mathematical calculus;
- to consolidate individual reasoning and the ability to analyse results;
- to improve self-esteem and confidence—praising a pupil who does not normally do well in mathematics is highly motivating;
- to realise that everything you learn can be taught to others.

Activities carried out during the event

Once the objectives were clearly defined, the Department listed some activities to implement Numbers Day, since one of the problems we had at the school was the lack of time to get things ready and we thought that careful planning would be a good way to make things easier for the teachers. The teachers took some of the suggestions on board or changed them to suit their needs.

Activities that were carried out included displaying books about mathematical pastimes with mathematical puzzles. This display was put on with the help of the language department and aimed to promote pleasure for reading and for books with mathematical curiosities. There was also a Games Room where many pupils have learnt

new mathematical reasoning games from the older pupils. The pupils themselves decided which games they would like to learn how to play. We looked on the market to see if there were any films related to mathematics and found “Donald in Mathmagic Land” by Walt Disney, which has been shown for several years to different groups.

To motivate the pupils we announced the event the day before. One of the parents accompanying their daughter told us that the girl had asked her mother to brush her hair really well because she was going to take part in Numbers Day and had to be pretty. We made posters advertising Numbers Day which were hung on the walls of the school corridors. We asked the secondary school students (14–16 years) to think of number-related games for the youngest pupils, and see if they could come up with anything better. The PE teacher wanted to contribute by demonstrating how the measuring devices in sport worked. In the week leading up to the event we gave the students some mathematical puzzles to work out with their parents and thus involve the family as well. In addition, over the week we explained the lives of great mathematicians.

All these activities were carried out on the first Numbers Day held in the school, with both parents and teachers, but above all the students, declaring themselves satisfied with the event. The level of satisfaction was measured by means of a questionnaire conducted over the days following the event. This event has been held for more than 20 years, with further activities being incorporated over time.

Games suggestions

A suggestion of games to play on Numbers Day was made for different ages, which were divided into different categories: games of chance, logic and reasoning, calculation, and order and probability. The suggestions are included in the table:

SUGGESTION OF GAMES

years	6	7	8	9	10	11	12	13
+board game	X	X						
\$ dominoes	X	X	X	X	X	X	X	X
% ludo	X							
& ludo		X	X	X	X	X	X	X
+ * dice		X	X	X	X	X	X	X
+ ° monopoly				X	X	X	X	X
+ \$ cards						X	X	X
+ bingo	X	X	X	X	X	X	X	X

+ Game of chance
 \$ Game of logic and reasoning
 & Calculation game
 % Game of order
 * Probability calculation game

What should teachers do to implement Numbers Day?

Before

- Create the right atmosphere and motivation for the event by making posters announcing the event, using human-like personifications of numbers to raise pupils' awareness about the constant presence of numbers in our everyday activities, and presenting some curiosities about numbers.
- Hold meetings at different levels in order to adapt Numbers Day to a particular school year.
- Search for and design games that contribute to develop the above-mentioned objectives. Each level thought about the most suitable methodology to achieve these aims and to organise the Day.
- Open a file with several pastimes and puzzles and hand them over to the teachers to help the day go smoothly.
- Arrange Games Rooms and Computer Rooms.

During

- Arrange the classroom according to a game-oriented distribution.
- Give the classroom a festive air by means of posters, blackboard decoration, etc.
- Organise the games.
- Call on different groups and invite those who are interested to solve the puzzles or work out the pastimes during the week.
- Calculate the timing for each game.
- Decide how each game will be scored.
- Observe those reactions that can

contribute to a better understanding of the child and group dynamics.

- Show students aged 11–13 years the Walt Disney film, “Donald in the Mathmagic Land”.
- Show recreational mathematics videos.

Follow-up activities

- Get feedback from tutors through a questionnaire.
- Hold an idea-sharing session about the activities carried out during the day.
- Gather all the activities suggested by the pupils in the class that complete the materials and resources for Numbers Day.
- Collect the feedback from every level to get an insight into the overall Numbers Day experience.
- Write a document about the activities that have been developed, the feedback, the results of the teachers' evaluations, the conclusions, the insights and the alternatives for the following year.

What should pupils do?

Before

- Search for, prepare and invent games and their rules.
- Look into numerical or mathematical curiosities.
- Bring to class all types of number-related objects (photographs, books, games, etc.).
- Organise the scoring systems for each game.
- Make a list of children who have taken on the responsibility to bring several games.

During

- Play the games.
- Make classification tables for each game to note down the scores.
- Show films and several videos related to the use of numbers in everyday activities, including the Numbers Day film.
- Make a presentation to classmates about the invented games and playing them.
- Speak about mathematical curiosities.

Follow-up activities

- Get some feedback through a questionnaire for students adapted to different levels.
- Implement new mathematics games into the school.
- Watch and discuss the film “Donald in Mathmagic Land” with the pupils.
- Watch and discuss several videos and the Numbers Day film.
- Make a classification table for each group, establishing the order for each member.

Feedback from the teachers

Once the activity was finished, we asked teachers to fill in a questionnaire to rate the success of the event. Questionnaires should be given promptly, when teachers still have the experience fresh in their minds.

Pupils also need to fill in a questionnaire to find out their level of satisfaction with the festivity, since the event is targeted at them. It is recommended that pupils be asked to complete the questionnaire the day after the event.

Conclusions about the experience

We wanted the experience to change pupils’ attitude towards mathematics. The main objective was “to enjoy learning mathematics”, and as the experience is repeated year after year we can see that the objective has been fully accomplished.

Among those who answered the questionnaire, 81.25 per cent of teachers did an evaluation with the students; 87 per cent of pupils would like to repeat the experience—and many teachers said they had had a very good time. This is why the event has been repeated, incorporating new elements and adapting it to new technologies.

Due to its success we have incorporated recreational mathematics into our everyday practice: recreational mathematics as a source of motivation.

Among the more than 400 teachers who have taken the course on motivating towards mathematics at the Summer School, (continuous training) of various Catalan Universities, 80 per cent believe that the experience is highly positive and that they will try to put it into practice in their own schools.

With the experience, we created a sense of enjoyment for mathematics. We need to instil life into the concepts and methods so that students can enjoy the results, and by “enjoy” we mean experience mathematics through emotions, because motivation is impossible without emotion. Motivation is the energy that inspires humans to achieve a goal. Everyone needs to enjoy life, but at the same time, we all need to do something we can be proud of. Success is what really motivates people, and to achieve it one needs to struggle. Teachers should guide students towards success.

As I always tell my undergraduates: “Mathematics makes life easier.”

End note

This activity became the basis for a doctoral research thesis: Raméntol, S. V. (2005). *Dia del número, motivació de la matemàtica*. Barcelona: Publicacions de l’Abadia de Montserrat.

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