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## NUMBERS UP TO 10 - MATHEMATICAL GAMES DURING DISTANCE LESSONS

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**Abstract:** On 19 October 2020, an epidemic was declared in Slovenia for the second time in that year. We altered teaching to long-distance. First-graders, who just got to know each other in less than two months and became partially aware of what school and teaching are all about, were particularly challenged. Questions began to arise about how to make distance learning as interesting and effective as possible for students at a distance, through computer technology. In mathematics, the numbers up to 10 are discussed in the first part of the school year. In order for the children to get to know numbers well, and to be able to imagine them quantitatively, it was necessary to prepare various activities and games that they performed at home during distance learning, and which were supposed to help them. Activities included both technology and a lot of movement, as children develop several areas at once through play and movement, and they also remember more. It turned out that children who regularly performed mathematical activities, after returning to school, had no problems counting, recalling, and writing numbers. Well-developed numerical representations also made it easier to understand the size relationships between numbers.

**Keywords:** mathematics, distance learning, mathematical games, numbers up to 10, 1st grade

### INTRODUCTION

Teaching in the first grade is a challenge for the novice teacher and the experienced teacher as well. Children are about six years old when they enter the first grade, they come from different kindergartens, some of them even enter an educational institution for the first time. It takes quite some time for first-graders to get used to the school rules and its way of working, which is in many ways different from kindergarten.

After two months in school, due to the coronavirus epidemic, for the second time in the same year, we started a longer period of distance learning, lasting 10 weeks. Teachers and older students were dealing with this way of working for the second time in a short period of time, but first-graders, who had only been in school for a few weeks, were faced with a special challenge. Classes were held every morning via videoconference, but the children still had to do their homework and activities on their own. In order for the children to be able to do their school work at home as independently as possible, the instructions were written and also recorded aloud.

Mathematics is one of the basic subjects in primary school, in the 1st grade there are four classes a week on the schedule. In teaching mathematics, we encourage various forms of thinking, creativity, formal knowledge and skills, and enable students to learn about the practical applicability and meaningfulness of learning mathematics. The development of numerical representations in the first period is based on practical activities (Učni načrt, Matematika, 2011).

One of the goals of 1st grade is for children to learn numbers up to 20. Many children can routinely count to 20 when they start school, but at the same time they do not know

individual numbers. When considering an individual number, there is a great emphasis on developing numerical representations that are not only pictorial but are related to concrete activities.

M. Cotič (2000) says that the child's world at this age consists mainly of concrete things and operations, so the lessons must be adapted to this. They must take place on a concrete, visual and not on an abstract level. Concrete level and experiential activity are important.

Before moving on to distance learning, we compared objects by size, length, width, and height in math classes, we orientated in space and on paper, sorted objects into displays, organized and counted to determine what is more, less or the same. As part of learning natural numbers, we learned numbers up to 5. During distance learning, we learned numbers from 6 to 10, and the number 0. The article presents examples of mathematical games for consolidating numbers up to 10, which children performed at home, in distance learning time. When counting, they were often active. Because technology is close to children, various applications have also been used in games. When preparing the games, the question arose as to whether they would be interesting enough to motivate children and attract them to play.

The basic goal of the activities and games presented in the article was to give children the best possible numerical representation during distance learning and to consolidate the record of individual numbers up to 10. Good numerical representations are the basis for comparing the size between numbers, which is also one of the goals of 1st grade. Math games are also supposed to be a motivation for learning, which often falls during distance learning.

It was expected that children who consolidated their knowledge at home with math games would be able to write down numbers up to 10 after returning to school and also be able to quantify them so that they could continue to study without interruption.

Knowledge of the notation of numbers was tested with various assignments on worksheets; how good the quantitative representations are has been shown in learning the comparison between number sizes.

### **THEORETICAL BACKGROUND:**

We encounter mathematics in most areas of human life and creation. Every time we look at a clock, a calendar, we have a phone call, look for the right bus number, pay bills or do the shopping, we are faced with quantities, numbers, counting, (Van Rooijen, Verhoeven and Steenbergen, 2010; Vipavc and Kavkler, 2015).

Mathematics is also one of the core subjects in elementary school. It is divided into three main topics:

- geometry and measurement,
- arithmetic and algebra,
- other content.

The main topics are divided into individual content sets, and the sets are also divided into individual contents. Objectives are defined for each topic.

Children learn numbers up to 20 in the 1st grade. The emphasis is on the development of number performances based on practical activities. In the process of creating the concept of numbers, the use of concrete materials, illustrations and appropriate didactic tools is mandatory. The main teaching methods are play, observation and experiential learning.

Numerical representations are crucial to successful mastery of mathematics. Poorly developed mathematical abilities and skills can have a significant impact on an individual's later mathematical achievements, school and work performance, as well as individual's standard of living (Geary, 1994; Duncan, Dowsett, & Claessens, 2007; in Van Rooijen et al. 2010).

In the classroom, different materials are used to develop numerical representations, not limited to pictorial ones, as their use alone is too abstract for students.

Children learn most easily through play, as they are more motivated and do not feel forced. The motor activities that take place through play are of key importance for the child's motor and functional development, in addition to which they also affect the child's cognitive,

social and emotional abilities and characteristics (Videmšek and Visinski, 2001). Children quickly memorize numbers, words, songs, rhymes, etc. All of this makes them even happier if they express it with movement. Through play and movement, children also implement knowledge from other areas.

However, the game must be carefully planned, because the teacher must know what goals he/she wants to achieve or consolidate with the game and how to use this new knowledge for further learning.

We learned the numbers up to 5 at school. We counted objects in the classroom, body parts, dots on the cube. During counting, we often clapped, jumped, squatted, or moved in some other way.

In the continuation of the article, games and activities that children played at home during distance learning are presented. With their help, they developed numerical representations, consolidated counting and notation of numbers up to 10.

## NUMBERS UP TO 5

- The child lays a plush toy on the floor. In the clip, the numbers between 1 and 5 are heard in random order. When the child hears the number, he skips the plush toy so many times and counts it out loud.



- Memory game, where a number and the same number of animals make a pair. The game is made in the Wordwall application.

<https://wordwall.net/play/6904/828/237>



- The child rolls a dice. First, it counts the number of dots and writes the corresponding number on the table with his finger. The child then chooses a sports exercise and does as many repetitions as there are dots. If he rolls a 6, the roll is repeated.



- The child makes 5 frog jumps forward and counts aloud from 1 to 5. It then takes 5 mouse steps back and also counts backwards, from 5 to 1.



- The child writes one of the numbers from 1 to 5 on one of the adults' back with its finger. The adult has to guess which number the child wrote.

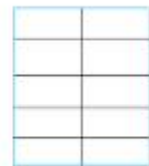


- The image shows a certain number of identical pictures. The child has to count the pictures, write the number on the table with his finger and then do the right number of squats.



### NUMBERS UP TO 5 AND NUMBER 0

- The child makes 5 balls out of newspapers. He prepares a piece of paper divided into ten parts and a container in which it will throw the balls. He/she takes three steps away from the container and throws the balls into it one by one. When it throws all five balls, it counts how many have landed in the container and writes the number on a piece of paper. He repeats the game until all the boxes are filled.



- The child divides a small sheet into six equal parts and write the numbers 0 to 5 in the boxes. It cuts the sheet in parts. It places the sheets on the floor so that the numbers are not visible. He places a toy on one of the cards and turns the other cards so that he sees the numbers. He finds out what number is hiding under the toy, then he makes that many jumps. He shuffles the cards and repeats the game.

0	3
1	4
2	5



- The child places the slips of paper from the previous task on the floor, so that there is a step of space between them. The slips must be in order, from 0 to 5. He jumps beside slips. First, he jumps on the left foot from 0 to 5 and counts loudly. Then he jumps on the right foot from 5 to 0 and counts loudly.



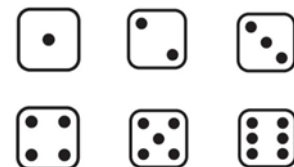
- The child arranges the slips from the previous task unevenly around the room. He/she jumps with both legs and counts from 0 to 5 loudly. Then it jumps on his/her toes from 5 to 0 and counts loudly.



## NUMBERS UP TO 6

- The child rolls a dice. In the PowerPoint, he clicks on a cube with the same number of dots and listens to a recording with instructions for a sports exercise. He rolls the dice at least six times.

- 1 - jump high into the air once
- 2 - rotate twice to the left and twice to the right
- 3 - make three squats
- 4 - strike the knees four times with both hands
- 5 - circle five times with your hands forward
- 6 - make six frog jumps



- The child divides a small sheet into six equal parts and writes the numbers from 1 to 6 into parts. It takes the sheet to another room. He/she prepares a bunch of macaroni (beans, pearls ...) in a bowl then rolls the dice and takes as much macaroni from the bowl as the dice shows. It runs to the slip and places macaroni on the right number. If the child throws a number already filled with macaroni, it does so many repetitions of any exercise, then the throw is repeated.



1	2
3	4
5	6

## NUMBERS UP TO 7

- The child places seven shoes one after the other so that there is a step of space between them, then crushes a ball out of paper and zigzags it between shoes with a wooden spoon. As it walks past the shoe, it says the number out loud.



- He/she guides the paper ball between the shoes by walking backwards and counting backwards, from 7 to 0.



- The child jumps from shoe to shoe with frog jumps, counting from 1 to 7. Back it jumps like a bunny, counting from 7 to 1.



- The child prepares a slip with ten blank fields and takes three steps away from shoes and throws a paper ball. It tells and writes down which shoe the ball landed on (for example shoe number four). If the ball lands between two shoes, the child finds out which shoe is closer to the ball. It repeats the throw ten times and at the end tells which shoe was hit the most.



- A game prepared in the Kahoot! application, where the child has to find a hidden number between the numbers from 1 to 7. There are eleven tasks in total, later two numbers are hidden and also three numbers.



### NUMBERS UP TO 8

- Eight different animals are drawn on the wheel of fortune prepared with the Wheel of Names app. When the wheel chooses an animal, the child takes eight steps around the room and imitates the movement of that animal. The selected animal is removed from the wheel of fortune.

<https://wheelofnames.com/view/2fz-8av/>



- The child places eight colored pencils on the floor so that there is a step of space between them. He/she jumps on one leg zigzag forward between the colored pencils and counts from 1 to 8. Then the child jumps back with both legs together over the colored pencils and counts from 8 to 1.



- Numbers from 1 to 8 are written in each part of the wheel of fortune, one number is missing. The child finds out which number is missing and does as many repetitions of the exercise shown in the picture.

<https://wheelofnames.com/view/crt-e7c/>



- Different number of spoon bangs against glass are recorded. The child listens to the recording and shows as many fingers as it can hear the beats. It then writes the right number with his/her foot on the floor.



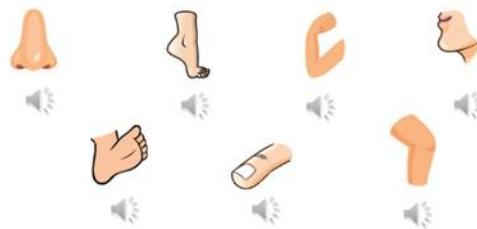
## NUMBERS UP TO 9

- The number is shown on the wheel of fortune. The child shows the right number of fingers, then strikes the lid with the colored pencil so many times and counts loudly.

<https://wheelofnames.com/view/mqf-ar9/>

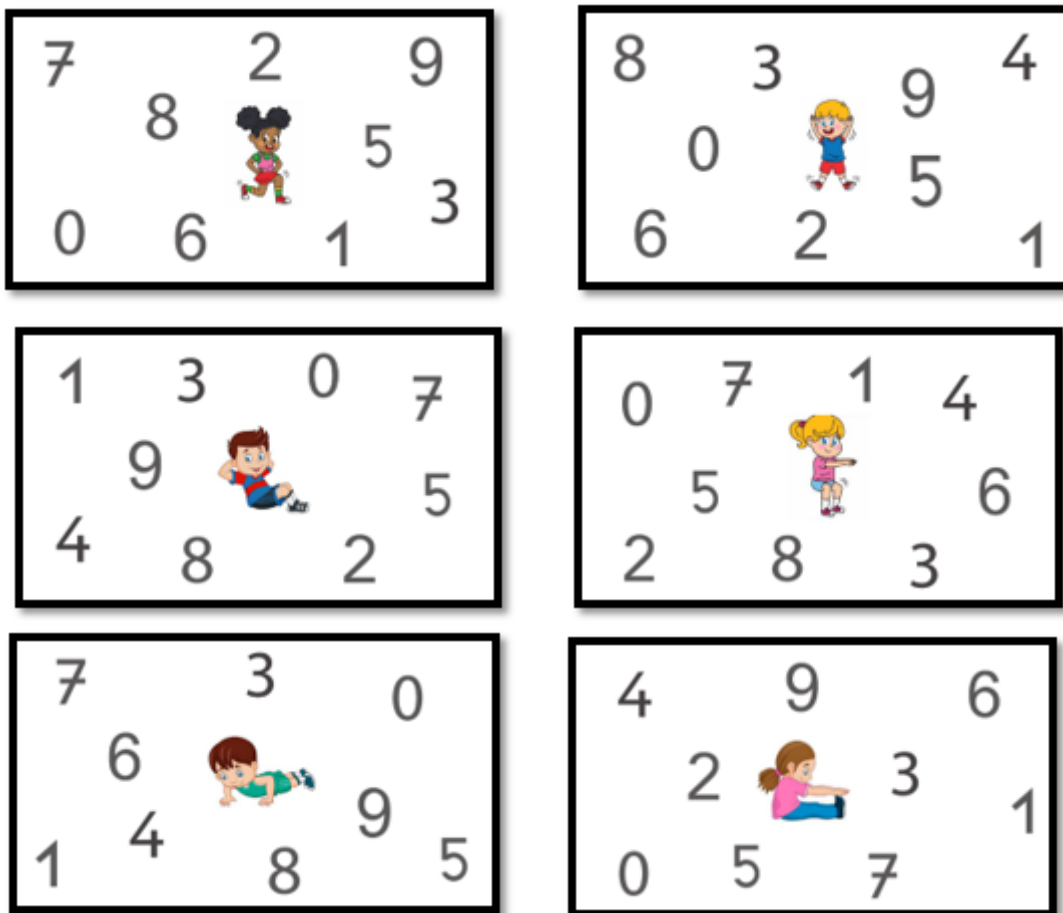


- The child listens the sound of the spoon hitting the glass in the recording. It counts the strokes and writes the right number on the table, floor or wall with the part of the body he/she sees in the picture.



- The child observes the pictures and finds which number between 0 and 9 is missing. Then it does as many exercises as the picture shows.





### NUMBERS UP TO 10

- The child prepares a medium-sized plush toy. The wheel of fortune shows a certain number of fingers. The child says the right number and throws and catches the toy that many times. At the same time, it counts out loud.
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<https://wheelofnames.com/mbm-232>



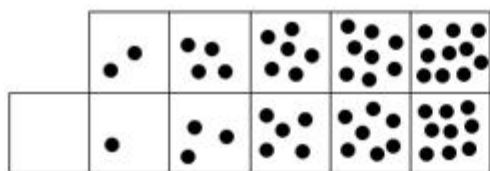
- The child prepares 10 macaroni (beans, pearls, ...). Ten steps away, it places an empty container on the floor. He takes one of the macaroni and transfers it to the container by imitating the movement of one of the animals in the picture. Each time he/she puts the macaroni in a container, he/she tells how many have already been brought.



- The child prepares slips of paper with drawn dots from 0 to 10. It crushes them into balls and puts them in a bowl. The wheel of fortune shows a part of the body. The child draws a slip of paper and writes the correct number on a table, floor or wall with a given part of the body.

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<https://wheelofnames.com/q78-gap>



- The child prepares plastic bottle caps where the numbers from 0 to 10 are written. He/she puts the bottle caps in a bag or container. In another room it makes 10 piles of macaroni (beans, pearls, ...), from one to ten macaroni in each pile. It places a chair in the middle of the path and draws a cap and takes it to the pile with the right number of macaroni. If the number he/she draws is bigger than 5, he/she climbs under the chair on the way back and forth.



- Two numbers appear on the wheel of fortune. The child counts from one number to another. It pays attention when counting forward and back.

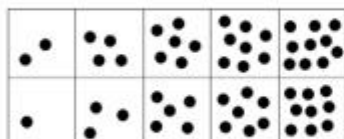
<https://wheelofnames.com/view/3nc-nxx/>



- The child arranges the plastic bottle caps with written numbers from 1 to 10 on the floor of the room so that there is a lot of space between them. He/she must see all the numbers. He/she rolls a small ball or a ball of paper from bottle cap with number 1 to cap with number 2 and all the way to the cap with number 10. Then, with a car or again with a ball, he makes a path from 10 to 1.



- The child prepares slips of paper with drawn dots from 1 to 10, and plastic bottle caps with numbers. It arranges the slips on the ground so that he/she sees the dots. A few steps away, the child prepares a small bowl and draws a cap, then grabs a slip of paper with the right number of dots with his/her toes and takes it to the bowl.



## CONCLUSION

After ten weeks of distance learning, we enthusiastically returned to school while social contacts were the ones we missed the most during that time. Of course, teachers were also interested in how many gaps in knowledge distance learning has brought.

According to the feedback from parents and children, most of the children were happy to perform games and activities at home in addition to their regular tasks, which means that activities were diverse and interesting. They motivated the children, enriched their homework, and at the same time strengthened their mathematical knowledge.

After returning to school, the children who regularly performed mathematical activities had no problems counting, recalling, and writing down numbers. Thanks to the well-developed numerical representations, they also understood the size relationships between numbers well. Because of that, we were able to continue with our lessons without interruption.

The chosen way of distance learning turned out to be appropriate in relation to the objectives of the curriculum and the age group of the students, and it brought positive results. The games were well planned, and the students remained motivated to work with a variety of

tasks and challenges. They completed the tasks with quality, acquired the skills and knowledge prescribed by the curriculum, and additionally acquired basic ICT skills.

The presented activities can also be used to diversify mathematics lessons at school.

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