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# Creativity Enhancement for Preschoolers through Mathematical Games

G. Cheta, V. Niculescu

**Gheorghe Cheta**
The Faculty of Education, Psychology and Social Work
University "Aurel Vlaicu" Arad
**Vasilica Niculescu**
Grădinița P.P. 10 Arad

**Abstract:** Not only does creativity manifest in the great mathematicians who create fundamental works, but also in countless little mathematicians who by solving basic problems, live the act of creation. Mathematics is the most suitable setting where the mind is stimulated towards flexibility, creativity and inventiveness.
**Keywords:** creativity, mathematician, elementary problem, stimulation.

Preschool is considered to be most important educational experience. It is the time in one's development with significant learnings which not only contribute to the development of one's individuality, but also lay the foundation of creativity.

More or less numerous and relevant prior to preschool, creative expressions are generally encouraged and developed by family and daycare to later be enhanced by the formal training of creative aptitudes in school. It is important that we, educators let learning take a constructive role to that purpose: we should foster and develop creativity, ensure a pleasant and conducive environment for its activities, and offer the appropriate content and methodology to diversify activities in relation to children's optimal responsiveness. The child alone will not be able to understand spatial relationships, geometric figures, nor to use numbers and digits. What children need is guidance- to gain independent thinking, group cohesion, tolerance and

openness to new ideas, ability to discover problems together with their solutions.

The preschool age is very sensitive to cultivating creative potential. Preschoolers are being trained gradually, systematically to solve simple problems and do exercises via entertaining mathematical activities, preferably games. Thus, it is imperative to exercise their intellectual, to boost their intelligence, sense of observation, creativity in finding new solutions to problems.

During preschool age, the first mathematical concepts are formed. This represents the solid foundation which will allow continued operation and build of mathematical knowledge throughout their lives. Thus, after internalizing counting from 1 to 10 together with simple mathematical operations with 1-2 units, the first computing skills and drills to solve problems are shaped. The contents of mathematical activities should be planned according to the age characteristics and previously acquired knowledge.

In this respect, we consider that the ***mathematical game*** to be the main method of teaching creativity in preschool. Through their variety, mathematical games exercise a great influence on the intellectual development of children, combining the game rules with didactic objectives. Once children enter school, they leave activities predominated by games and switch to those ruled by learning and school work. The new preschooler can only cope with the information overload by combining learning with the game.

In kindergarten- an environment governed by simple rules and pleasant atmosphere, the mathematical game empowers children to focus easier and faster on the tasks at hand. The game itself gives rise to positive emotions, stimulating interest and the desire to achieve a concrete purpose.

Based on a set of rules, the game contributes to the seamingless integration of the child in the community. It functions as an exercise of willingness and character, leads to collaboration and self-sufficiency, develops entrepreneurship and curiosity, and advances the application of knowledge spontaneously. Introvert children gain confidence in their capabilities. Encouraged and advised whenever necessary, they will gain more trust in their actions.

One paramount principle in designing and holding teaching-learning sessions is the alternation of various activity types, together with the customization of the teaching methodology and cooperation. We must ensure a balance between activities focused on educational tasks and the relaxation and movement which result from the game. The game has an

important role in the lives of children of six or seven, as they learn by playing. They learn to interact with their game partners, to communicate with them, to follow rules, to play a specific role, and to deal with problematic situations or even conflicts. The game provides many efficient learning settings for the child's development.

Through the game, instructor teaches children to gradually develop and leverage their induction, analysis and synthesis abilities, to hypothesize, to check, to generalize and to strive for certainty.

Per Jean Chateau, *"game is both effort and freedom, so an education through game must be a source of both physical effort and moral joy. To this end, we must offer the child the obstacles to overcome."*

To internalize knowledge easier and to include fun activities, instructors could hold mathematical games such as:

***Who knows to count further?*** is a learning game that aims to teach counting and involves the whole class.

**What numbers were hidden? -** using chips with numbers and tables of numbers, children will determine the missing numbers in a given range, forming and learning to count in an ascending and descending order.

Gradually, children will be involved in games which aim to orderthe natural numbers in a logical series, previously discovering the rule string. A few popular games are as follow:

***The playful bee*** **-** which gathers pollen from Grandma's 10 flowers, skipping every two flowers. On its way back, it collects pollen from flowers left. Children will determine the two routes of the bee.

***Let us count the vegetables, fruits, and flowers***. These are games to learn the numbers from 0-10 and the correct use of their names. The teacher must vocalize all numbers through 10, while the children would repeat and use thieir names correctly.

Place of a number in the string of natural numbers. To correctly state the place of a certain number, the children will have to specify the number before the one in question (the predecessor), and the number that follows it (the successor).

Game such as the following are conduciveto learning this:

***Find your neighbors!*** teaches the order identification of natural numbers and strengthens the understanding of the relationship between the numbers. The game may be conducted using some teacher-made visual material or cards from the „Numbers Game".

***Place me in my box!*** seeks to teach the build of a string of numbers and consolidate counting skills. Observing tables with numbers and a few

empty spaces, children will have to use separate cards and fill in the gaps on the grid with the corresponding number.

While developing the concept of a number, to make children familiar and understand numbers in print (block lettering), teachers may choose visual aids such as boards. The items on each board represent the matching numeral, written in print on the same board.

To capture children's interest for the knowledge of the natural numbers from 0 to 10, we have always sought to propose new games with new situations to solve intriguing problems. Combining the game with the learning experience, we guided the 'discovery' of natural numbers 0-10 and their basic operations. Then, we pursued a deeper understanding of the concept, its graphical representation (the numeral) and the development of a visual and auditory memory, attention, the spirit of observation, analysis and comparison as a thinking process; finally, but not least, the development of the language skills through the fluent and accurate expression of the activities throughout the game.

Next, we will present some educational games, which have contributed to achieving the following learning objectives:

- Learn the natural numbers from 1-10;
- Perform addition and subtraction with one and two units;
- Explore ways of breakdown the numbers to 10;
- Write and solve problems involving one operation;
- Orally compose exercises and problems after pictures;
- Constantly verbalize the detailed calculations used in solving problems and exercises;
- Demonstrate willingness and enjoyment in using numbers.

When incorporated in the learning experience, the game renders a more vivid and attractive character, brings variety, fun and relaxation, and prevents monotony, boredom, and fatigue.

***Riddles and verses*** are more pleasant and they make problem-solving activities more fun.

❖ Lica has 7 apples
And he eats 3 of them,
No maple!
His little sister thinks
To give him Snapple
Yet, she gives him
One more apple.
Say quick and firm, don't babble
Lica now has.... how many apples?

Figure 1

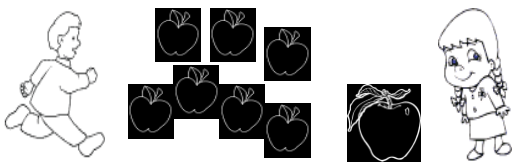


Figure 2

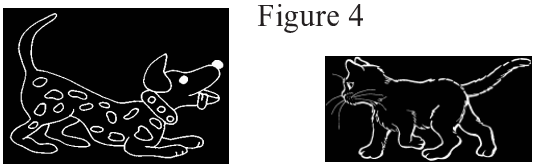
❖ Four geese on a trail are having fun.
How many wings are in the sun?
How about feet?

❖ In the meadow,
There's a flower
Red is actually its color
But other six are yellow.
Think again,
What's in the meadow?
How many flowers of any color,
Can you count at this hour?

Figure 3

❖ A dog and a kitten,
They play happily
In the kitchen
Go ahead, count
How many tails and paws
The two friends count
Now, say it loud!

Figure 4



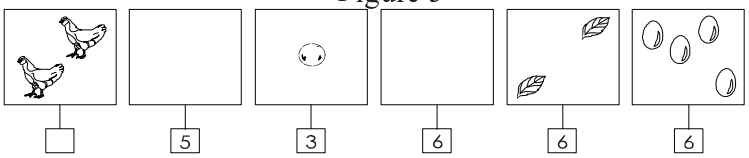
Mathematical games combined with activities related to art not only ensure versatility, but also the internalization of these concepts, in a fun and joyful manner.

The game "***Who makes the most beautiful drawing of a child?"*** has the following learning objective: complete a given image with missing pair elements. For instance, for number 2, focus on the dual parts of the human body.

The knowledge we used individual recording sheets, such as:

***Draw as many items as the numeral in the each box shows;***

Figure 5

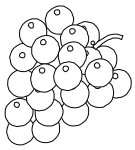


***Color the fruit on the branch of two only!***

Figure 6

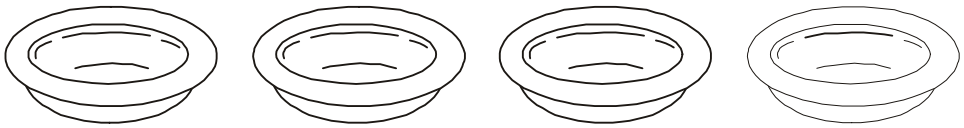
***Color 8 grapes!***

Figure 7



***Place one fruit on each plate!***

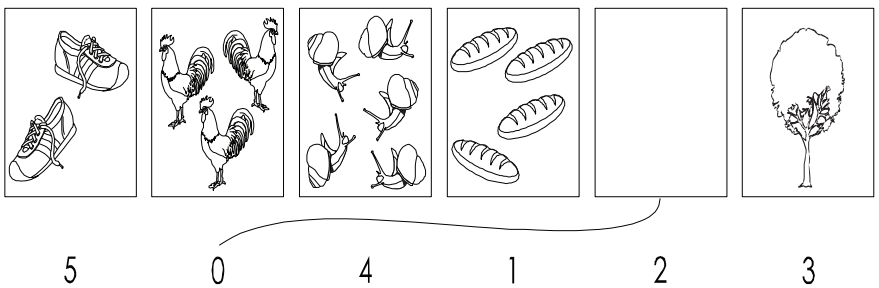
Figure 8



Teaching the concept of a number can be achieved through worksheets such as:

***Match the number of items in each box with the corresponding number.***

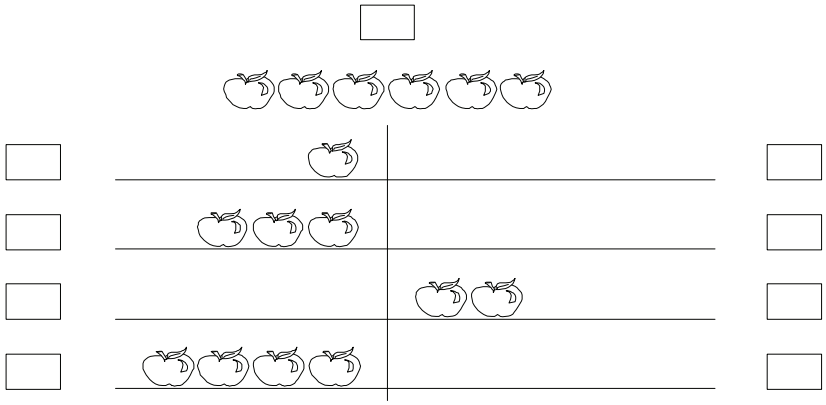
Figure 9




By playing games and exercises, ***composing*** or ***decomposing*** numbers, children become familiar with simple operations- addition and

subtraction. These should be planned and organized gradually from simple to complex, from concrete to abstract.
Use different worksheets, such as:

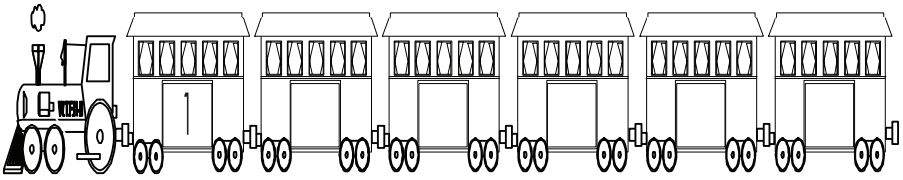
Figure 10



Games aimed at decomposing a given number and finding as many solutions as possible have a competitive nature, stimulating students' logical thinking and creativity.
To learn the **sequence of numbers from 0 to 10,** we carried out with the kids games such as:

Figura 11

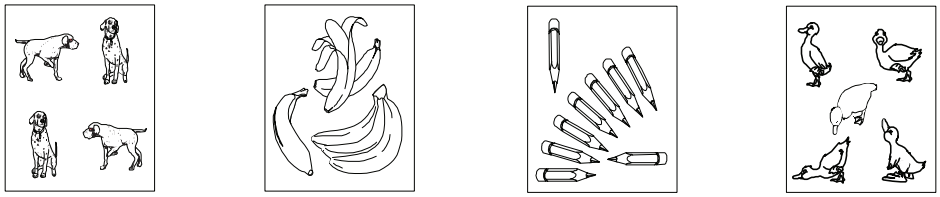
**Let's count train cars!**



With the knowledge of counting, children become familiar and learn the numbers in print. Thus, the concept of that number will be inextricably linked to it graphical representation.

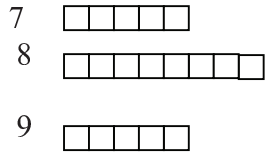
***Count and circle*** the number that shows how many objects are:

Figure 12



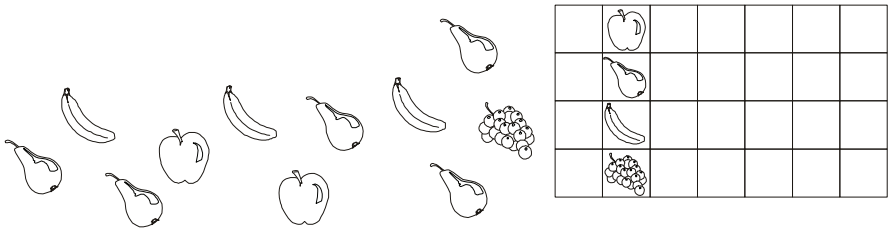

***Take out or add to ensure you have as many squares in a row as the corresponding number indicates.***

Figure 13




***Collecting data in a grid*** is a useful and practical activity and can take place as an assessment activity. Each child "reads" the table, finds the assigned tasks by herself, counts the items inside the table, sorts them, collects the data in the table, and then matches each number with the items.

Figure 14



For **placing a number has in a string**, several games can be used: ***Color with red- the third and eight flower, in yellow- the first flower, and in blue- the flower that follows the fourth flower.***

Figure 15

Draw:
- More dots than the mushrooms;
- Fewer dots than mushrooms;
- As many dots as mushrooms.

Order, the following numbers in a increasing, then decreasing order: **3, 5, 1, 8, 2, 7, 6.**

***Songs and poems*** that can be used to support exercises with natural numbers from 0 to 10 and their order: "Count", "Elephant", etc.

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