

## ROTATION BY STATIONS: STUDYING FRACTIONS



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### ABSTRACT

The following work presents the experience report of an activity carried out with students of the 4th year of Elementary School I. Such activity was based on an active methodology called Rotation by Stations, in which some environments are set up to form a circuit composed of different activities. The objective of the activity was to review the initial idea of fractions, concepts and mental calculations, starting from half and a quarter of numbers and figures. In all, the students went through three stations (Kahoot!, Puzzle and Half Card Game) in which they had to use critical and mathematical thinking to solve the proposed problems.

**Keywords:** Mathematics. Fractions. Rotation by Stations. Recreational Mathematics. Active Methodologies.

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## INTRODUCTION

Post-pandemic learning has undergone significant changes; New techniques and methodologies began to be studied and applied in classes. Many educators sought innovations and technologies to implement in the classroom. One of them was the Rotation by Stations, an active methodology that seeks to place the student as the protagonist through activities set in stations, in which students go through them according to the teacher's guidelines, which can be carried out in groups or individually. In addition, this methodology follows the hybrid model, in which the activity makes use of digital technologies as learning tools. Lilian Bacich (2016, p. 683), defines Rotation by seasons in a way in which

(...) Students are organized into groups and each of these groups performs a task according to the teacher's objectives for the class in question. The planning of this type of activity is not sequential and the activities carried out in the groups are, in a way, independent, but work in an integrated way so that, at the end of the class, everyone has had the opportunity to have access to the same contents.

Active Methodologies seek to develop the teaching-learning process in order to awaken student engagement and autonomy, providing opportunities to make decisions and find solutions to everyday situations and problems. Neusi Berbel (2011, p. 29) reports:

The student's engagement in relation to new learning, through understanding, choice and interest, is an essential condition to expand their possibilities of exercising freedom and autonomy in decision-making at different moments of the process they experience, preparing themselves for future professional practice.

Taking as a starting point the experience focused on the discovery, sharing of ideas and recreational mathematics from the games, the proposal of the study of fractions through the Rotation by stations was elaborated. In the proposal, the students went through three stations in which they needed to work in groups or individually to resume, improve and put into practice the concept of half and a quarter.

## METHODOLOGICAL APPROACH TO EXPERIENCE

It is worth mentioning that at the school in question, 4th grade students already have specialist teachers in each area. Therefore, the Mathematics teacher is licensed in the discipline and not multipurpose. In addition, students have access to individual computers to carry out proposed activities.

The main objective of the activity was to review the initial content of fractions (half and a quarter), both their numerical and pictorial representations. Therefore, the students already knew and had studied the content previously. This preliminary study took place with the help of the school's didactic material, activities with folding, problem solving and systematization exercises.

One of the methodological approaches used in the construction of the activity was Recreational Mathematics, which through various tools seeks to provide a fun, creative and popular Mathematics. Researcher David Breyer Singmaster (2000, p.4) defines this Mathematics from two perspectives:

- Recreational Mathematics is Mathematics that is fun and popular, that is, the problems need to be understandable to any interested lay person, although the solutions can be more complex. (author's translation)
- Recreational Mathematics is mathematics that is entertaining and used pedagogically both for a divergence from serious mathematics and as a means of making mathematics understandable and palatable. (author's translation)

This approach is known for the use of *puzzles* and games, however its main objective can be conveyed from the phrase of the mathematician Jorge Nuno da Silva (2013), who says that "Mathematics is the pleasure of thinking", and this is what the activity sought to provide for the students.

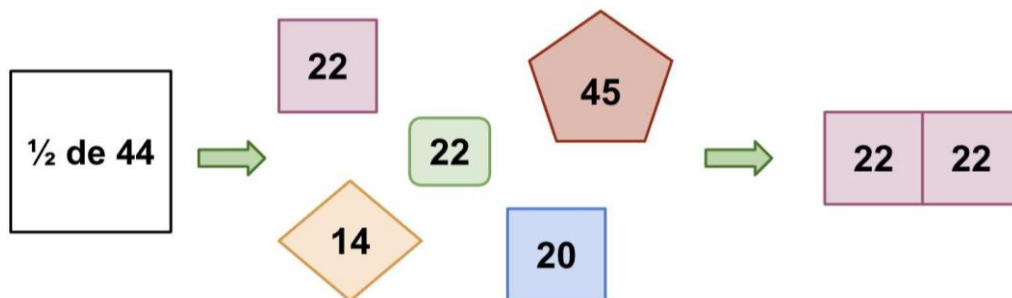
The three stations were formed by games, all aimed at the study of fractions of half and a quarter. The first station was a game from the online platform *Kahoot!*, in which students worked as a team to propel the submarine to prevent the monster from reaching them (this game mode is provided by the platform itself and is called "*Submarine squad*"). In this game, students needed to think quickly to answer mental calculation questions about fractions.

Image 1: Submarine Squad game from the Kahoot!



The second station is a game of his own authorship, designed to work on the numerical calculation and pictorial representation of a fraction. The idea starts from a puzzle. Initially, students draw an instruction letter in which they need to perform the suggested calculation and then look for the pieces that correspond to the result of the calculation. For example, if they draw the instruction " $\frac{1}{2}$  of 44", they need to look for two pieces written "22" that when they join them together they form 44. However, in addition, to reinforce that fractions are always divided into parts of equal size, the chosen pieces, in addition to having the correct number, also need to have the same shape, to assemble the puzzle correctly.

Image 2: Example of the puzzle



Finally, they played the Half Card Game, in which students must color, in the same color, the numbers that correspond to half and double each other. In this way, reinforcing reciprocity related to fractions.

Image 3: Example of a card from the Half Card Game

8	3	50	1
7	5	6	14
2	10	16	500
20	100	250	40

## DATA ANALYSIS AND PRODUCTION OF RESULTS

The analysis of the data and production of results was based on a teacher's observation and feedback from the students. The observation came from the teacher of the classes and three teachers who worked in the process as station assistants. The class teacher rotated between the environments to perceive the participation and engagement of the students. The teachers who worked permanently in one of the stations, on the other hand, carried out a more direct observation of each group, pointing out possible difficulties and students with more difficulty in performing the proposed games. The feedback took place later, in the classroom, in which each child answered a questionnaire reporting their experience in the activity and their perceptions about the performance in each station.

In short, it can be observed that the activity provided moments of fun, discoveries and interactions, in which the students engaged spontaneously. Everyone wanted to participate and collaborate with the development of the activities. The participation and enthusiasm of the students during all stages can be observed. In addition, the feedback from the students was full of praise and excitement. Moreover, learning can be observed later during more formal reviews of fraction contents, in which previously existing doubts were no longer present among most students.

## DISCUSSION OF THE RESULTS

Some important considerations that were raised during the discussion of the communication of experience were the applicability of this activity in different school years and the possibility of adapting the stations according to the school environment.

The Rotation by Seasons can be applied in all school years, as its main objective is to perform a rotationality among students, in which they have the opportunity to go through different environments designed and developed in order to meet their specific needs. This methodology has a range of possibilities, and can be applied in any subject, in any school year and in any school that has a means of inserting at least one environment that takes advantage of technology. On this aspect, it is important to emphasize that rotation models need to

(...) Students take turns in the activities carried out according to a fixed schedule or according to the teacher's guidance. The tasks can involve group discussions, with or without the presence of the teacher, written activities, readings and, necessarily, an online activity. (BACICH, 2016, p. 682).

That is, it is necessary that at least one of the stations is connected to the technological scope. And this is due to the fact that this methodology is associated with Hybrid Teaching, whose definition given by Bacich, Tanzi and Trevisani (2015) defines it as "a pedagogical approach that combines face-to-face activities and activities carried out through digital information and communication technologies".

Another point of discussion was the possibility of adapting the activity in different school environments, mainly related to infrastructure aspects. The main question raised was the need for one or more people responsible for each station and the possible difficulty in having such people available. A suggested solution is the increase of student-instructors, in which the students themselves play this role and help in the development of the activity. This is another way of placing the student as active in the teaching-learning process in order to highlight and value their importance within the school environment.

With the greater participation and engagement of students, active learning becomes even more active in this activity. Because in this practice it is considered that the responsibilities given to the student will enable a more effective and meaningful learning, because the

Active, participatory learning is superior to passive and purely dependent learning. If it is possible for him to go in line with his interests, to study the problems that concern and challenge him, to choose the form and rhythm to study their solution, the student will intensely mobilize his resources (JUSTO, 2001. p. 175).

## **CONCLUSIONS AND/OR FINAL CONSIDERATIONS**

With the experience developed and applied from the Rotation by stations, teamwork and Recreational Mathematics, it is possible to observe the construction of mathematical, logical and scientific knowledge in each fourth-year student, as they elaborate hypotheses, investigate and apply knowledge to the proposed problems.

In addition, through the questions raised and the discussions held, it was possible to infer that through the use of the Rotation by Stations methodology, the learning possibilities are multiple. Through it, the potential of active learning is explored and put into practice, in a fun and effective way.

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