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## “SPIKES AND SNOOTS” WE ALL SOLVE (INFANTILE AND FIRST CYCLE)

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## INTRODUCTION

Are we all capable of solving problems and at any age? We are clear, after several years putting it into practice with students of these ages that yes, also in a simple and dynamic way.

## GOALS

To attend to the diversity of our students in the area of mathematics, specifically in problem solving

Fully develop problem-solving skills in Preschool, Primary and Secondary Education students, so as to improve general academic performance and in Language and Mathematics in particular.

## PROPOSAL

Problem solving is a priority content in the Mathematics area because it is a means of learning and reinforcing content, it gives application meaning to the area and allows interaction between the different blocks and the other areas.

In the methodological approaches, it must be taken into account that students must develop and perfect their own strategies, while acquiring other general and specific ones that allow them to face new situations with a probability of success. As José Antonio Fernández Bravo says “you have to start from successful situations”

To achieve student motivation, the problems must be well selected, with simple statements, all of them taken from situations and contexts that facilitate the acquisition of content.

The problems must be drawn from situations that start from the reality of the students, and from imaginary situations that are attractive to the student. It is interesting

to propose open problems with increasing difficulties.

The terms “problem” and “exercise” are quite often confused. A problem can be defined as a situation in which it is intended to achieve a goal whose achievement is blocked, either due to lack of resources, information... The subject must not know a priori the path to reach the goal, because if not, no It would be a problem, it would be an exercise. For a situation to be considered a problem, it must exist:

- A person who wants to solve it
- An initial state and a final state (goal to achieve)
- Some type of impediment to the passage from one state to another

We will put a problem to exemplify how to approach problem solving learning in the different educational stages. In this specific case we will focus on Infant and First Cycle. This proposal will be complemented by the one presented by the Primary and Secondary classmates, since they will solve the same problem in more advanced stages, using more complex strategies, favoring the deepening of mathematical content.

This methodological proposal has been promoted jointly by the Ministry of Education, Universities, Culture and Sports of the Government of the Canary Islands and the Isaac Newton Canary Society of Mathematics Teachers for several years through the Canary Newton Mathematics Project (MNC). Bruner’s phases and problem solving are followed, according to Polya and Shoenfeld, Miguel de Guzmán and Manuel García Déniz adapted to Primary and Secondary.

After a reflection on the characteristics of the students of these ages and taking into account the phases of Polya, a definition of interesting phases and diagrams was reached and how to put them into practice.

### 1. Phases and diagrams

## 1.1 Phases:

### 1.1.1 Tell me the story.

It is the phase of understanding the situation and identifying the relevant information based on the objective.

### 1.1.2 Let's think of a way to solve it.

It is thought individually, shared in a small group and an idea of how to carry it out is chosen in a large group.

### 1.1.3 Let's get to work

We carry out the idea that seems most appropriate to obtain a solution.

### 1.1.4 We respond

The students assess the solutions obtained through questions asked by the teachers.

When we are sure that the solution or solutions are valid, we express the answer orally, graphically or in writing. Later it will be verified if the solution is valid or not.

We will present the “beaks and snouts” problem and we will see how to solve it using the “trial-error” and “modeling” strategies, two strategies that are quite appropriate for the levels in which we are going to work.

## RESULTS

The results have been published in the state school council [4] and in the Canary Islands school council

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