INTELLECTUAL OUTPUT 02

MATHEMATICAL CREATIVITY

4 Creativities Project
№2019-1-BG01-KA201-062354

INTRODUCTION

The aim of FCREATIVITIES project is to improve the teachers' abilities to generate a creative education, leading to the creation of students who are able to think, analyze and solve daily problems. With the following six activities we aim to equip the teachers with some easy to implement, fun to organize exercises to be used with **10 to 12 year old students**, focusing on enhancing their motivation, logical thinking and **mathematical creativity**. The very nature of mathematics provides a suitable platform for developing creativity. Mathematical creativity could be defined as the process that results in unusual and insightful solutions to a given problem, irrespective of its level of complexity. Mathematical creativity is observed when one generates a non-standard solution for a problem which may not be solved so easily using the conventional methods.

Title of the activity

Hourglasses and measuring bowls

Description

Logic and mathematics always go hand in hand. When students are trained to use logical reasoning, they are provided with a very powerful tool that enables them to develop critical thinking skills that would become very useful in their future personal and professional development. Apart from that, these skills enable them to effectively train their mathematical skills and to extend mathematical concepts and processes to other disciplines. Last, but not least, mastering the logical thinking helps them to easily make connections between different theoretical areas and understand the concepts faster.

The following activities train the logical thinking of the students combined with their simple mathematical knowledge. Logical thinking is the process by which a

person uses consistent reasoning to reach certain conclusion(s). Problems or situations that involve logical thinking require a structure, a connection between facts and chains of reasoning leading to a decision.

Aims

1. Developing logical thinking

2. Developing creative and "out of the box" thinking

3. Developing problem solving skills

4. Developing fast and precise thinking

5. Improving mathematical skills

Steps we must follow

1. Each student works on the puzzles individually.
2. Give copies of the puzzles to each student. Alternatively, you can read aloud each task and allow them to write the important information.

Materials (if needed)

➢ Printed tables and diagrams for each student
➢ Paper; pencils; erasers

Puzzle 1

You need to boil eggs for exactly 9 minutes, or else the visiting Duchess will complain, and you will lose your job as head chef.

But you have only 2 Hourglasses, one measures 7 minutes, and the other measures 4 minutes. How can you correctly measure 9 minutes?

Puzzle 2

You have three bowls: 7, 4 and 3 liters in capacity.

Only the 7-liter is full.

Pour the fewest times to have the bowls containing 2, 2 and 3 liters.

Tips

Puzzle 1 (Solution)

Put the eggs on to boil and start both hourglasses running.

When the 4-minute one runs out, turn it over immediately so it starts counting 4 minutes again

When the 7-minute one runs out, turn it over so it starts counting 7 minutes again

The moment the 4-minute one runs out for the second time, turn the 7 minute hourglass over - it will have only been running exactly one minute.

Let the sand run back again (1 minute more) and then take the eggs off straight away, because they will have boiled for 9 minutes.

(4 minutes twice, plus one more minute = 9 minutes!)

Puzzle 2 (Solution)

Fill the 4-liter from the 7-liter bowl.

Fill the 3-liter from the 4-liter bowl.

You will have 3 liters left in the 7-liter, 1 liter in the 4-liter and 3 in the 3-liter bowl. (Let us abbreviate that as 3,1,3)

Now pour from the 3-liter to the 7-liter bowl, and then pour the 1 liter left in the 4-liter bowl to the 3-liter bowl. (Now it looks like 6,0,1)

Now fill the 4 from the 7 (Now it looks like 2,4,1)

Now fill the 3 from the 4 (Now it looks like 2,2,3)

And you are done: 2, 2 and 3 liters !