9 High School of Nikaia

Program: “MATHEMATICS AND ART”

During the school year 2013-14, the program “Mathematics and Art” was realized in our school. The participants of this program were 19 students as well as three teachers (Mr. Kouridakis Marinos, Art teacher, Mrs. Glinou Katerina, Mathematics teacher and Mrs. Papasinou Chrysoula, also teacher of Mathematics).

The goal of this program was for the students to approach Mathematics through Art, to appreciate the worldwide existence of Mathematics and to learn how to use them, themselves, in order to create a work of art. The group would gather every Tuesday, after the ending of the school sessions. In addition to these “late” sessions, some of the program subjects were discussed within the school hours, inside the entire classroom.

As a result, almost each and everyone of the students came in contact with the program, but there were also those, who were very intrigued and started approaching Maths from a different and better point of view.

The program consisted of the following parts:

A. During the group gathering, we would present a work of art, as well as the biography of the artist. Among these artists, were Phidias, Leonardo DaVinci, Kandinsky, and Sol LeWitt. The work of Art was discussed upon, firstly from an aesthetic point of view and then, from a Mathematician’s aspect, about the Mathematical ideas contained in the work. Some of the biographies were also presented by students, as a project.

B. The group decided to create its own work of art, on the east wall of our school-yard. The goal of the work was for the students to use Mathematical ideas they had learnt, to co-operate and to create art. The idea of its making, as well as the subject of the work, was decided after group-thinking, so that everyone would be satisfied.

   We concluded that we would draw the beach of our dreams, where mathematical ideas would be born and where they would always reside.

   The students measured and constructed a big rectangle (5mx2m), which they later colored. After that, they drew the median of the rectangle (which would ultimately become the horizon’s line in the drawing), and added two more rectangles and a square, until everything in the drawing seemed harmonically blended together. Following to that, they worked inside one of the rectangles creating the division of a line segment in golden ratio, the snail of square roots and the Pythagorean Theorem. Then, the students added geometric shapes inside the second rectangle and the square, so as to create complex artistic motifs.

The whole process was a harmonic collaboration, with the Art teacher, as well as with one another. As a result, the group concluded the art work with great success, and the Math-Art work still lies on the wall and makes our school yard a more beautiful place.

C. The group collaborated with the people of Herakleidon Museum, who taught the students a great deal about the combination of Maths and Art. The students from A' class of our high school, worked on mirage in Art and their interpretation through Mathematics. The students of B' class, worked in symmetry and were presented with the role of symmetry in the art works of Escher. The students of C' class, worked on randomness and fractals, based on Escher's art-work. Additionally, a group of students visited the art exhibition of Mr. Fokas, professor in the Superior School of Beaux-Arts, in the Aristotle's University, in Salonika, and discussed with him.

   After all this gathering of information, we created a questionnaire, which was completed by 40 of the school students, and its results were harvested and processed by three students, with the aid of Mrs. Glinou. The questionnaire had the objective to discover the attitude of the school students, regarding to Maths, and their beliefs on whether or not Mathematics could have a link to Art. The results were these: 45% of the students answering the questionnaire stated that they like Maths much or very much, when only 5% stated that they don't like it at all. The majority (62.5 %) stated that they always pay attention during a Mathematics class and that they understand the Maths' teacher quite well. Last but not least, 67.5 % of the students, stated that they really enjoy the classes when Mathematics are combined with Art.

D. Two pairs of students performed two dialogues on mathematical issues and presented them to the rest of the students. The first dialogue was written by Mr. Theofilos Kakoulos, professor in the University of Athens, in the Department of Mathematics and is included in his book named "Mathematical Journal". The second dialogue was created by Mrs. Glinou Katerina and it is based on (and named after) the prime numbers.

In conclusion, this program gave to teachers and students alike, an intrigue and a start for a different approach to Mathematics. We also discovered new ways to enrich the teaching of Math through Art, and to gain the attention of even more students. Needless to say, we all had a very educational, fun experience and hope to repeat it in the future.