ANGLES

Subject: Maths

Topic of the module: Angles

Age of students: 11

Number of students: 25

Required prior knowledge: Students perceive the angle of the shapes as part of the plane and not just as two intersecting halves.

Objectives:

Students are expected to be able to:

• Compare angles

• Locate the larger angle (between two)

• Measure the opening of an angle with the protractor

Arts involved:

Paintings, artwork, playing

Resources:

Student's book, flyers with paintings, computer, projector, protractor, ruler triangle, rice paper, fishing game

Time frame:

2 teaching hours (45 min per lesson)

Methods of work:

Group work, individual work

Procedure / steps:

Initially, a brief reference is made to the life and work of artists Joan Miro and Wassily Kandinsky, on which the teaching of the lesson is based. Specifically, the following videos https://www.youtube.com/watch?v=H8fnuANZFuM&t=8s and https://www.youtube.com/watch?v=m0SvtX37M10 of the Educational Greek Television, are projected and the students have a discussion about the similarities and the differences between the paintings of the two artists, such as the use of geometrical shapes or the intensity of colours.

Students are divided into groups of 5. A picture with a painting by Miro is provided to each group. The names of the paintings used are: '*The tilled field' (1923), 'The Dutch interior I' (1928), 'The swallow love' (1934), 'The portrait II' (1938) and 'Ciphers and Constellations in love with a woman' (1941)*. Students are asked to find in each image as many angles as possible. At the same time, it is highlighted that the size of the angle does NOT depend on the length of the sides. It is of crucial importance for the students to bear that in mind because the angle is a particular concept, the understanding of which is a matter of concern to students, who perceive it as two intersecting lines, rather than a part of the plane.

The given paintings are projected on the board and students are asked to locate two different angles in a painting, stick out the sides of them with the marker, in order to prove that the angle doesn't change if they draw its lines longer/prolong them. Then, the groups continue finding and marking on each painting, as many angles as they can.

Subsequently, depending on the type of angles they locate, they are provided with the appropriate explanation of the concepts of acute, obtuse and right angles. They are then asked to discover the specific types of angles and to prove their answers by measuring them. The teacher demonstrates meticulously how the protractor is used and asks students to begin measuring various types of angles depicted in their images and present them to the other groups. They also make a demonstration to the whole class by using the big protractor of the class. To further familiarize them with the specific notions they are encouraged to use rice paper to compare the angles and find out in practice that a larger angle is the one with a larger opening and NOT the one with larger sides.

Finally, an interesting video which tries to travel the students in the fantastic Miro's way of painting, is shown, https://artclassproject.com/%CE%B6%CE%BF%CF%85%CE%AC%CE%BD-%CE%BC%CE%B9%CF%81%CF%8C/

The same procedure is followed using five paintings by Kandinsky, in the form of an assessment process, this time, i.e., the students try to find all the angles in their image and classify them accordingly. The names of the paintings given are: '*In Blue' (1925), 'On White II' (1923), 'Black and Violet '(1923), 'Transverse Line' (1923) and Circles in a Circle' (1923).*

In the end, students play a game (fishing game). They are divided in the Red, Green, Orange, Yellow & Blue groups and are provided with a magnetic fishing rod and a number of fish, the mouths of which have different angle-shapes. The teacher asks them to catch a fish with, e.g. an acute- angle –mouth. The group that manages to attract, with its fishing rod, the correct type of fish <u>the fastest</u> is the winner.

Evaluation

Before teaching the particular maths module, students were provided with a worksheet including activities for angles. Primary school learners start doing angles from the 4th grade, but the distinction between the kinds of the angles is taught in the 5th grade. Thus, some short of familiarity with the angles is expected. As soon as they completed the worksheet and answered some questions in a test form, i.e., the pre-test, the lesson started.

Reflecting upon the whole procedure, we can claim that the students enjoyed the lesson and they expressed interest in the two artists, Joan Miro and Vasili Kadinsky, upon whom the lesson was based. The fact that they received information through videos, pictures, drawings and games made the lesson appealing yet exciting and this was proven by the pupils ongoing involvement and continuing participation in the teaching/learning process.

Furthermore, the results of the post–test given to the students after the end of the lessons, prove the effectiveness of the art's use in gaining & consolidating the new knowledge.