AN IDEA ABOUT IMPLEMENTING INTERDISCIPLINARY APPROACH USING MATH. GEOMETRIC SHAPES – TRIANGLE. REVISION 8TH GRADE – LANGUAGE SCHOOL "IVAN VAZOV"

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Abstract. *The path to development in modern education is linked to applying innovative oriented strategies for learning, which ensure active communication in the class room and give a platform for the students to become active components. Using the interdisciplinary approach, creating mind maps, solving cognitive tasks increase the theoretical training and motivation in the students. They become active parts of the studying process. The students also become more responsible, kind, active, with creative thinking and cooperative spirit.*

Key words: mathematically literate person; learning through cooperation; interdisciplinary approach; modern technologies; logical thinking, creativity.

> *The essence of mathematics lies in its freedom*
> G. Cantor

Math is art, one of the oldest and most significant accomplishments of mankind. It is a high-level creative activity, an intellectual adventure, which teaches us how to think logically, be resourceful and consistent. All the modern technologies would simply not exist without it.

Modern learning of Math is based on understanding one of the key competencies in education: Math competency and acquiring of basic knowledge in the field of natural science and technologies, and the skill to educate ourselves.

Creating an interactive place for studying and implementing innovative methods and techniques are the most important parts when working in a modern classroom. The basis for Math education is using the following innovative methods and approaches: experimental approach, problem-based

learning, project-based learning, cooperative learning, use of modern technologies, multidisciplinary approach and interdisciplinary approach. Those methods increase the students motivation, leading to better performance and also development of their critical and logical thinking. The student gets more active and the teacher becomes their mentor, educating them how to be responsible, kind and creative.

The interdisciplinary approach when teaching Math helps with creating many basic skills and habits for creative activity, transferring knowledge, increasing motivation for learning and for developing the logical thinking of the students. One of the purposes of my work is when solving cognitive tasks in literature, art, music and natural science the students can learn more about the meaning of Math and its application in everyday life.

Type of lesson: Revision

Lesson Objective

To solidify the knowledge, skills and attitude, relevant to mathematical competency and digital creativity, key competence about cultural awareness and creative performances. When applying this type of competent approach, the students should:

- actively use technology;
- use their learning skills;
- use cultural competency;
- be able to communicate using foreign languages;
- find interdisciplinary approach with IT, literature, art, music, architecture and nature using the Triangle /Revision/;
- expand their logical knowledge and skills, and form a logical culture.

Form a positive attitude towards Math, create interest and motivation for the students so that they can expand their knowledge and skills on:

- elements of triangles;
- angle bisector, median and altitude of a triangle;

- determining the types of angles /right angle, acute angle, obtuse angle, straight angle/;

- determining the perimeter and area of a triangle.

Methods, procedures, tools

- Interactivity;

- Integrality;

- Work as a team;

- Solving cognitive and practical tasks;

- Filling worksheets;

- Formulating conclusions and making a summary.

Preparation

- All students have to create a mind map for:

- Elements, dependencies, area and perimeter in a triangle /on paper or on an electronic device/

- The class is divided in 4 groups and each group needs to find interdisciplinary approach in studied literary works, art, architecture and nature.

Group One

In a studied piece of literary work try to figure out the relationship between characters that most resemble the vertices of a triangle.

Group Two

Triangle shapes in art /examples/.

Group Three

Triangle shapes in architecture /examples/.

Group Four

Triangle shapes in nature /examples/.

Lesson Structure

The lesson starts with the performance of our ensemble in the rhythmic gymnastics in the Tokyo 2020 Olympic Games.

Brainstorming

Find and write down on a poster the geometrical figures, which the ensemble portrays during their performing act

....

What is the time signature used in the musical piece performed by Elitsa and Stundji?

....

How many beats does it have: ..../2/

Is it even or uneven: ..../even/

What is the time signature: ..../ /

What is the message that the performance sends?

....

/teamwork, hard work, consistency, diligence, perfection, harmony, symbiosis/.

The message being sent by the performance of our golden girls should be used as a basis for our relationship going forward, because that is the key to success.

One of the shapes you recognized is a triangle. Today we will go over everything we have learned about the triangle geometric shape. That expertise will be very important, because we will be building upon all that this year when we learn more about: midsegments and the centroid in a triangle.

You had a task to create a mind map of a triangle either on paper or on an electronic device. Present your work.

We work in groups. Every group has 3 tasks. You have 6 minutes for all tasks and 4 minutes to present your work. We will follow all the group work rules.

Group One

Task 1. For the angles α, β and γ of $\triangle ABC$ is known that $\alpha : \beta : \gamma = 2 : 3 : 4$. CL is an angle bisector of $\angle ABC$. If LQ $(Q \in BC)$ is parallel to AC and $LD(D \in AC)$ is perpendicular to AC. Find in degrees the size of:

- α, β and γ;

- $\angle CLQ$;

- $\angle CLD$.

Task 2. You will need to research within what limits every angle α, β and γ in triangle ABC changes by making a dynamic model using Geogebra.

Task 3. Tell us about the relationship between characters in a studied piece of literary work that form a metaphorical triangle.

Group Two

Task 1. Point M is the midpoint in the side CD in rectangle $ABCD$. Prove that: $\angle AMD = \angle BMC$ and $\triangle ABM$ is an isosceles triangle

Task 2. We have a $\triangle ABC$ with angle $\alpha = 38°$. What should the other two angles be to get the following types of triangles:

- acute;

- right;

- obtuse;

- isosceles;

- equilateral.

Task 3. Where in art and in the dance from earlier can we find triangle shapes?

Group Three

Task 1. In the acute $\triangle ABC$ the perpendicular bisectors of AC and BC intersect into point Q. Prove that:

- point Q lies on the perpendicular bisector of side AB;

- $\angle AQB = 2\angle ACB$.

Task 2. You have been presented with the image of the drawing "Vitruvian man" made by Leonardo da Vinci in 1490, created as an attempt to study the proportions of the human body. Find the geometrical shape triangle, make measurements and calculate the area of the triangle.

Task 3. Give examples of triangle shapes in architecture.

Group Four

Task 1. In the right triangle $\triangle ABC$ the hypotenuse $AB = 12$ cm and $\angle BAC = 15°$. Find the size of the:

- median to the hypotenuse;
- altitude on the hypotenuse.

Task 2. Find the area of the $\triangle ABC$.

Task 3. Give examples of triangle shapes in nature.

Summary

Task 1. Put the words in the right order and you will form the definition of a triangle:

a triangle is a, shape, three vertices, closed, In geometry, with, three straight sides, two-dimensional, and

Task 2. Connect with lines the elements of the triangle with the right definition:

- Line segment that joins one of its vertices with the center on the opposite side   *Altitude*
- Line from a vertex to the opposite side, that is perpendicular to that side   *Median*
- Line segment that bisects one of the vertex angles of a triangle   *Angle bisector*
- Vertices $AB = c,\ BC = a,\ CA = b$
- Sides $A,\ B,\ C$
- Angles $\angle CAB = \angle A = \alpha$
                                        $\angle ABC = \angle B = \beta$
                                        $\angle ACB = \angle C = \gamma$

Task 3. Fill in the blanks.

In geometry, a triangle is a closed, two-dimensional . . . . with three . . . . sides and . . . . vertices.
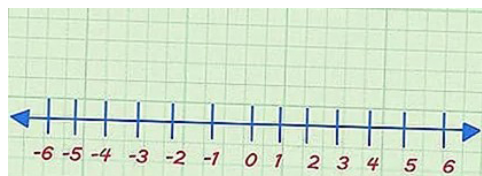
Figure 1.

Please, would every one of you give a score on the scale below expressing how useful you found the lesson?

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