Computer graphics with STEAM in mind

Lesson plans

Marketplace of Knowledge for Digital Education Methodology

2020-1-HU01-KA226-SCH-094158

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DIGIMARKET PROJECT

Introduction

The aim of this curriculum module is to link the acquisition or practice of basic computer graphics skills for students aged 13-18 with an introduction to the characteristics, artistic expressions and major artists of the op-art art movement.

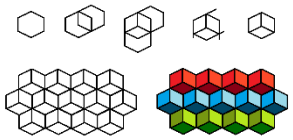
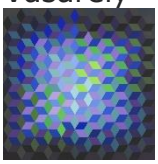
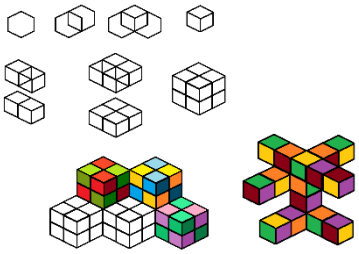
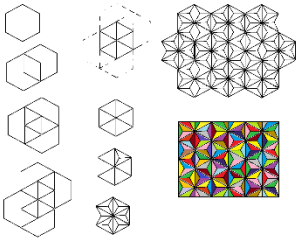
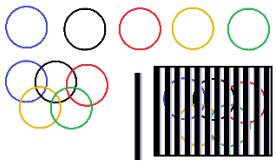
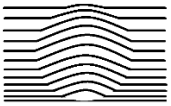
This way, we can build a whole STEAM project with our students, including art history, visual culture, physics and biology, as well as computer science.

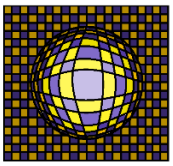
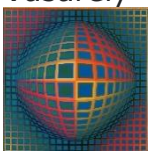
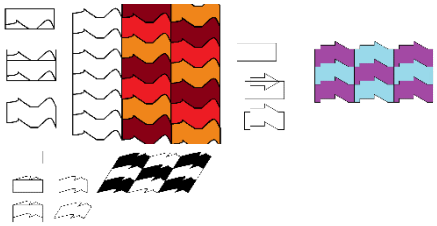
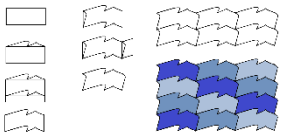
- art history: study and analysis of the op-art movement, its artists and their works
- visual culture: creating graphics
- physics, biology: knowledge of lights and colours, vision, perception of what is seen, awareness of the physiological phenomena behind optical illusions
- computer science: basic functions and tools of computer graphics programs

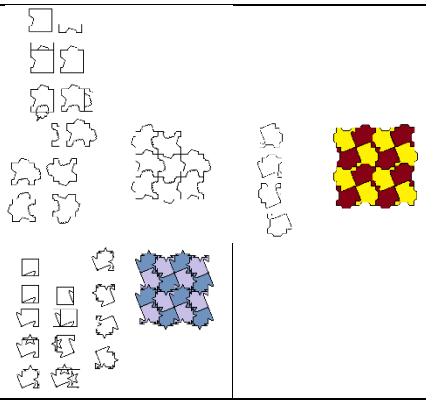
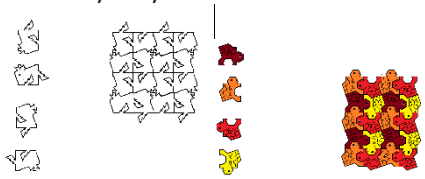
The following topics and lesson plans cover 10 sessions of 45 minutes each. They include possible methods of learning about the art theme, some resources, computer graphics methods and tools to be learnt/practised in each session, suggested exercises.

We also make suggestions for the presentation and evaluation of the information collected, the graphics produced.

Themes

Clock	Graphic design task	The tools used	Artistic inspirations
1.	spatial representation of a surface made up of cubes	regular hexagon, fill in, copy, eraser, colour shades 	Vasarely 
2.	spatial representation of a surface made up of cubes	regular hexagon, fill in, copy, eraser, colour shades 	Vasarely, Andrade  
3.	spatial representation of a surface made up of regular triangles	regular hexagon, fill in, copy, eraser, colour shades 	Agam 
4.	Create a figure with lines	ellipse, line application, copying, eraser, crosshatching 	Agam 
5.	Representing a curved surface with lines	ellipse, use of line, drawing a curve, eraser, filling in 	Vasarely, Andrade

			
6.	Representing curved surfaces with lines, colour shades	ellipse, use of line, drawing a curve, eraser, filling, colour shades 	Vasarely 
7.	mosaic making by copying, deciding, sketching	rectangle application, drawing curve, copying, decision, eraser, filling, colour shades 	Escher
8.	mosaic making by copying, deciding, sketching	rectangle application, drawing curve, copying, decision, eraser, filling, colour shades 	Escher 
9.	mosaic making by copying, rotating, sculpting	rectangle application, drawing a curve, copying, rotating, eraser, filling, colour shades	Escher 

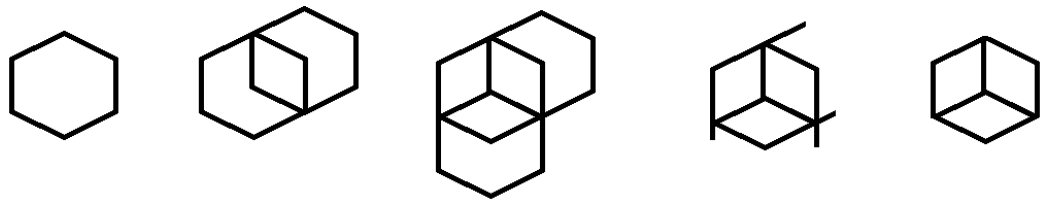
			
10.	making mosaics by copying, deciding, sketching, using built-in shapes	rectangle application, curve drawing, built-in shapes application, copy, decision, eraser, fill, colour shades 	Escher

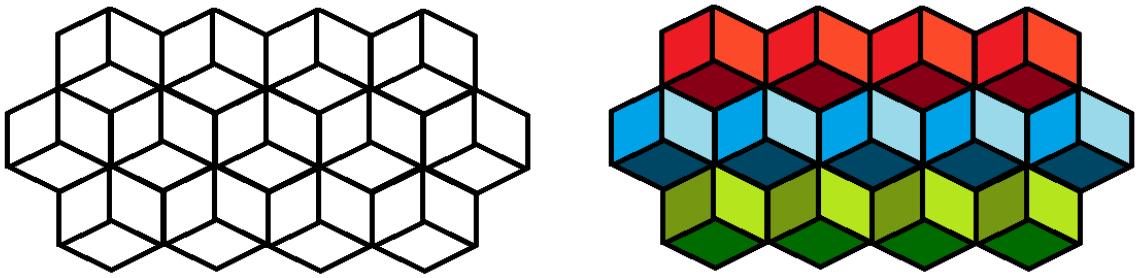
Lesson plan - lesson 1

Tasks of the lesson:

- Exploring the work of Victor Vasarely
- spatial representation of a surface made up of cubes
- graphics software: drawing regular shapes, copy settings, eraser function, fill in, define custom colours

Time	Activity	Methods	Goals	Tools
8'	Introduction, followed by a presentation of the relevant iron ore paintings, identification of optical illusions	frontal, projection, passing around an album, etc.	inspiration	pictures from the image collection, internet, albums, projector
15'	Researching and collecting information on Vasarely's oeuvre online	pair work, internet research	enriching knowledge of art history, making a portrait gallery. Understanding the concept of op-art	computer, internet https://vasarely.hu/eletrajz/
7'	Drawing cubes from regular hexagons, defining and using individual colours	frontal	Improving basic IT skills	computer, internet
12'	Drawing graphics inspired by Vasarely paintings	individual work	Strengthening basic IT skills (using regular hexagon, filling in, copying, eraser, defining individual colours), developing creativity, creating a product	computer, graphics software
3'	Evaluation of works created, end of lesson	group discussion	self-assessment, evaluating each other, highlighting positives, discussing mistakes	computer, graphics software, projector



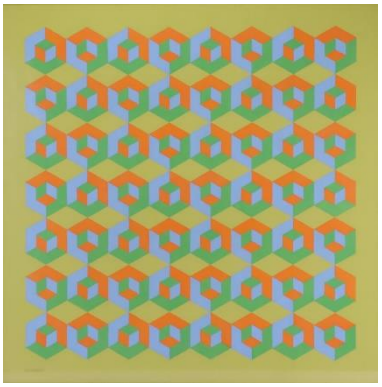


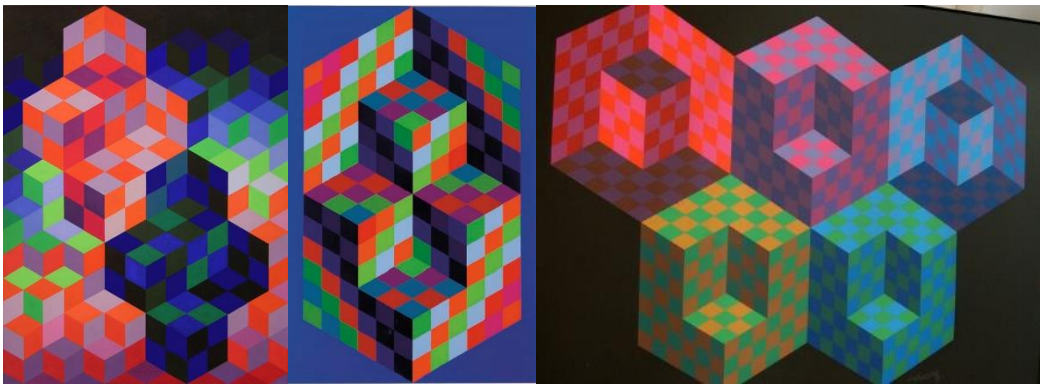
Lesson plan - lesson 2

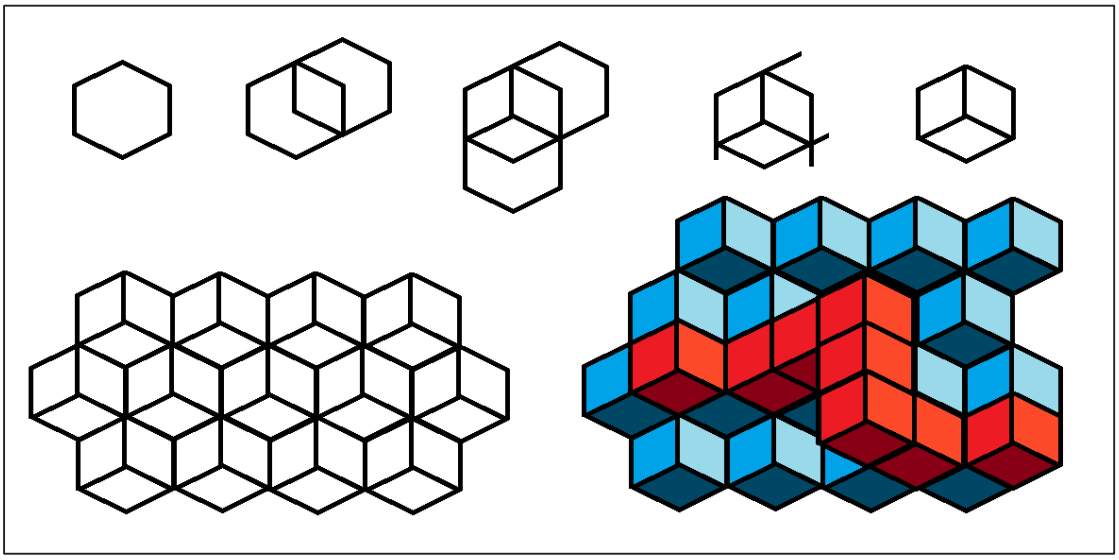
Tasks of the lesson:

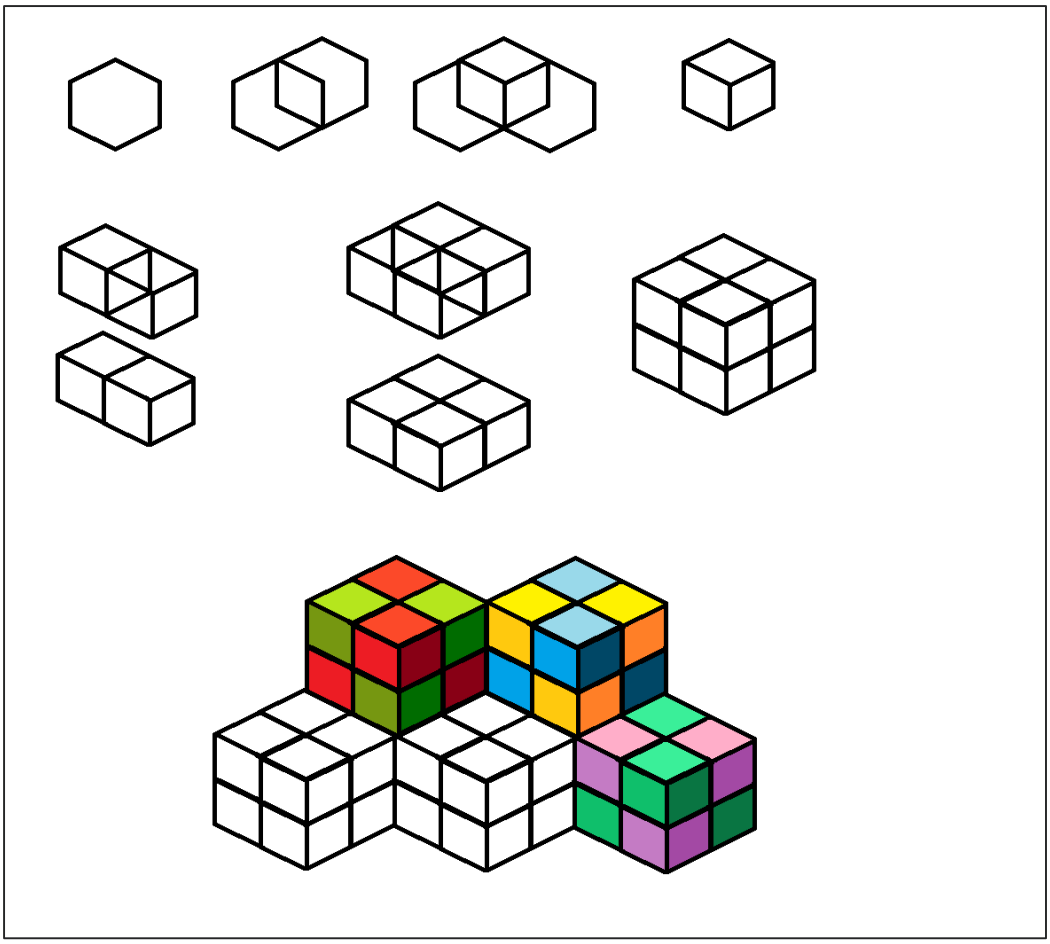
- Exploring the work of Edna Andrade
- increase knowledge of axonometric representation
- spatial representation of bodies made up of cubes
- graphics software: drawing regular shapes, copy settings, eraser function, fill in, define custom colours

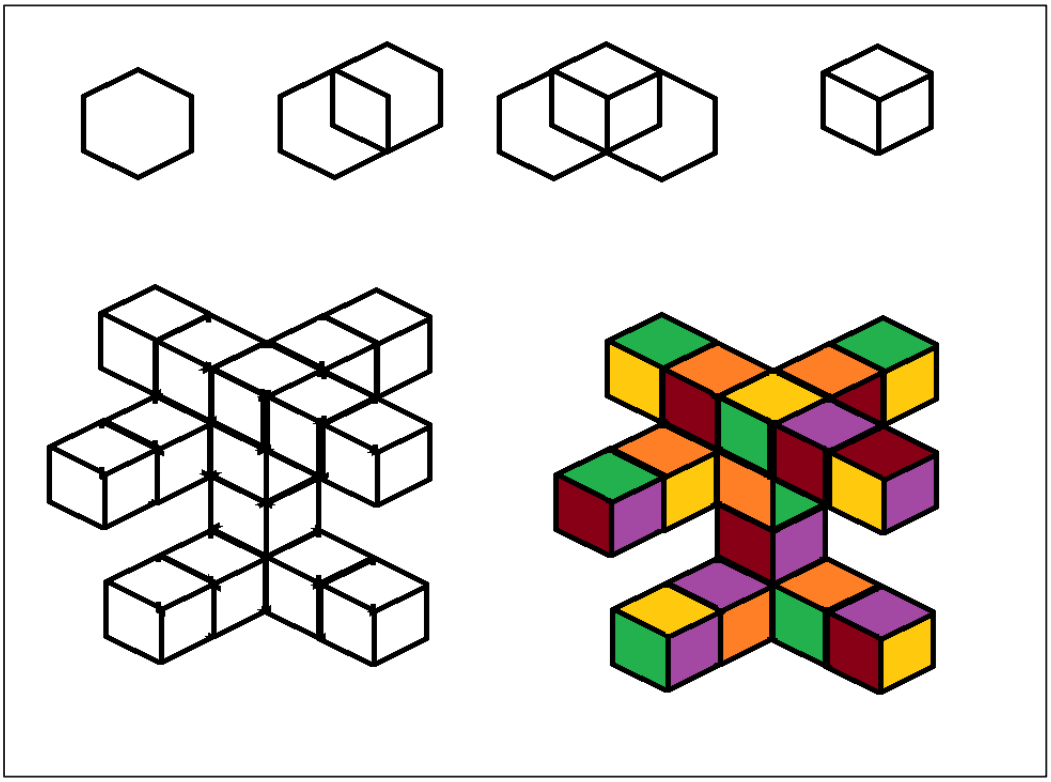
Time	Activity	Methods	Goals	Tools
4'	Introduction Presentation of the life work of Edna Andrade	frontal	inspiration	pictures from the image collection, internet, albums, projector
8'	search the internet for more paintings by Vasarely and Andrade, where cubes are used to represent space	pair work, internet research	enriching knowledge of art history (op-art), creating a collection of images, inspiration	computer, internet https://www.askart.com/artist/Edna_Wright_Andrade/78743/Edna_Wright_Andrade.aspx
18'	Drawing graphics inspired by Vasarely or Andrade paintings	individual work	Strengthening basic IT skills (using regular hexagon, filling in, copying, eraser, defining individual colours), developing creativity, creating a product	computer, graphics software
10'	create a common google form to vote for the graphics	collaborative work on an internet platform	IT skills enhancement (google form), assessment ahead of time	computer, internet
5'	evaluation of the works created, end of lesson	voting, group discussion	self-assessment, evaluating each other, highlighting positives, discussing mistakes	computer, internet projector











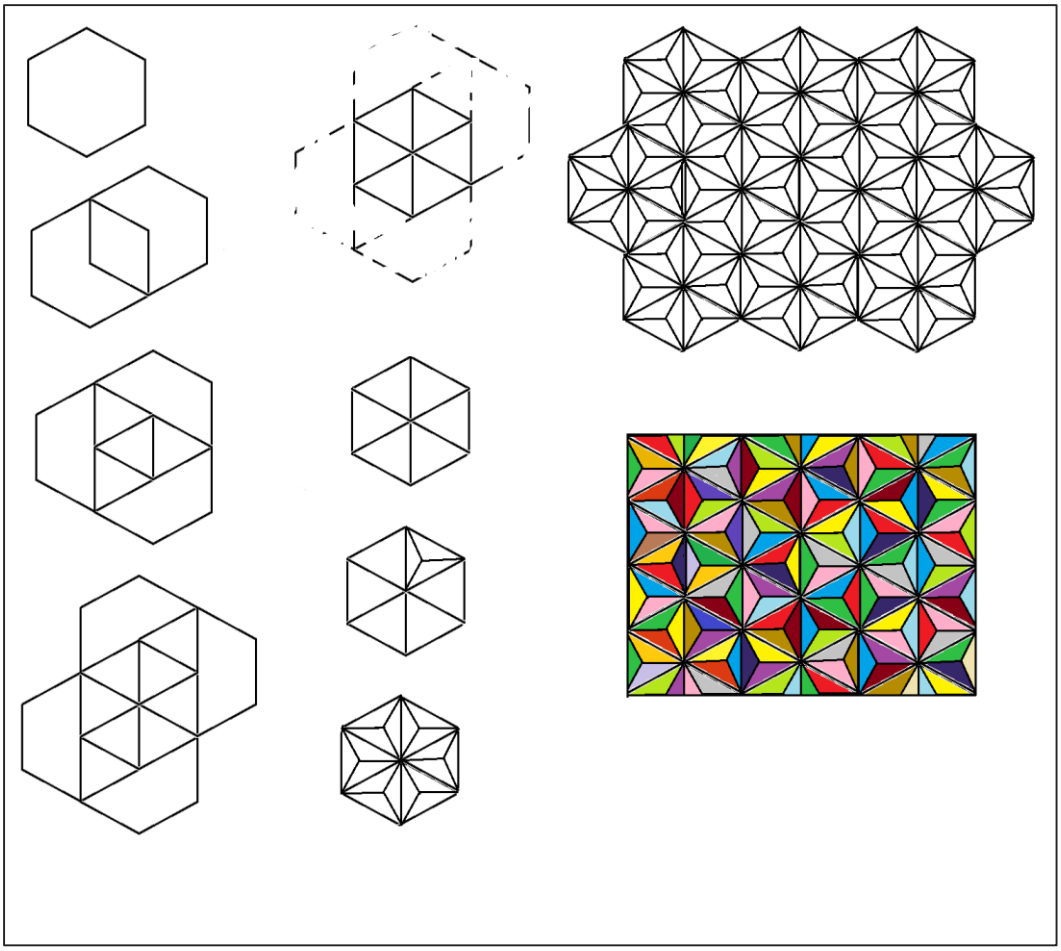
Lesson plan - lesson 3

Tasks of the lesson:

- Exploring the work of Yaacov Agam
- increase knowledge of axonometric representation
- relationship between triangles and regular polygons, representation of spatial surfaces made up of triangles
- graphics software: drawing regular shapes, copy settings, eraser function, fill, define custom colours, colour mapping, shades

Time	Activity	Methods	Goals	Tools
2'	Introduction	frontal	inspiration	pictures from the image collection, internet, albums, projector
8'	Researching and collecting information on Agam's oeuvre on the internet	pair work, internet research	enriching knowledge of art history, making a portrait gallery Understanding the concept of kinetic art.	computer, internet https://www.britannica.com/biography/Yaacov-Agam
5'	search the internet for more paintings by Agam and Andrade, where triangles are used to represent space	pair work, internet research, slide show	enriching knowledge of art history, creating a collection of images, inspiration	computer, internet
20'	Drawing graphics inspired by Agam paintings	individual work	basic IT skills (isosceles, regular and right triangle, filling, copying, eraser, defining individual colours), developing creativity, creating a product	computer, graphics software
5'	upload graphics to the common google form	collaborative work on an internet platform	IT skills enhancement (google form), assessment ahead of time	computer, internet

5'	evaluation of the works created, end of lesson	voting, group discussion	self-assessment, evaluating each other, highlighting positives, discussing mistakes	computer, internet projector



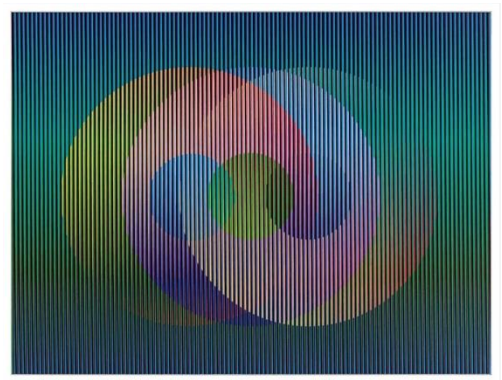
Lesson plan - lesson 4

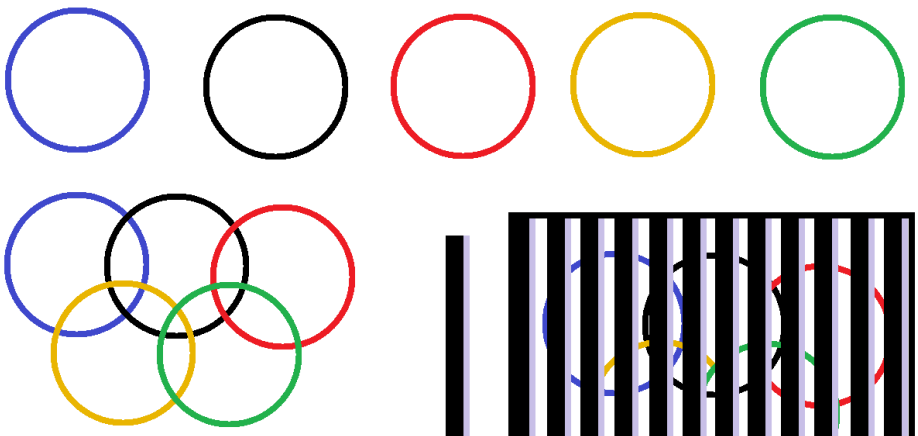
Tasks of the lesson:

- Exploring the work of Carlos Cruz-Diez
- collecting experience on optical illusions
- relationship between triangles and regular polygons, representation of spatial surfaces made up of triangles
- graphics software: drawing lines at a given angle, line properties, copy settings, eraser function, fill, define custom colours, colour mapping

Time	Activity	Methods	Goals	Tools
2'	Introduction	frontal	inspiration	pictures from the image collection, internet, albums, projector
8'	Research and collection of information on the life work of Carlos Cruz-Diez on the Internet	pair work, internet research	enriching knowledge of art history, making a portrait gallery Understanding the concept of kinetic art.	computer, internet https://cruz-diez.com/ https://en.wikipedia.org/wiki/Carlos_Cruz-Diez
5'	More, Agam and Cruz-Diez, Search the internet for Vasarely paintings where a combination of figures and lines make up the graphic	pair work, internet research, making a slide show	enriching knowledge of art history, creating a collection of images, inspiration	computer, internet
20'	Drawing graphics inspired by the collected paintings	individual work	basic IT skills (setting line properties, drawing parallel lines, copying, eraser, defining custom colours), developing creativity, creating a product	computer, graphics software
5'	upload graphics to the common google form	collaborative work on an internet platform	IT skills enhancement (google form),	computer, internet

			assessment ahead of time	
5'	evaluation of the works created, end of lesson	voting, group discussion	self-assessment, evaluating each other, highlighting positives, discussing mistakes	computer, internet projector



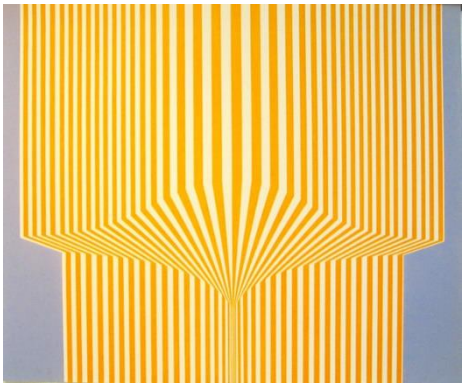


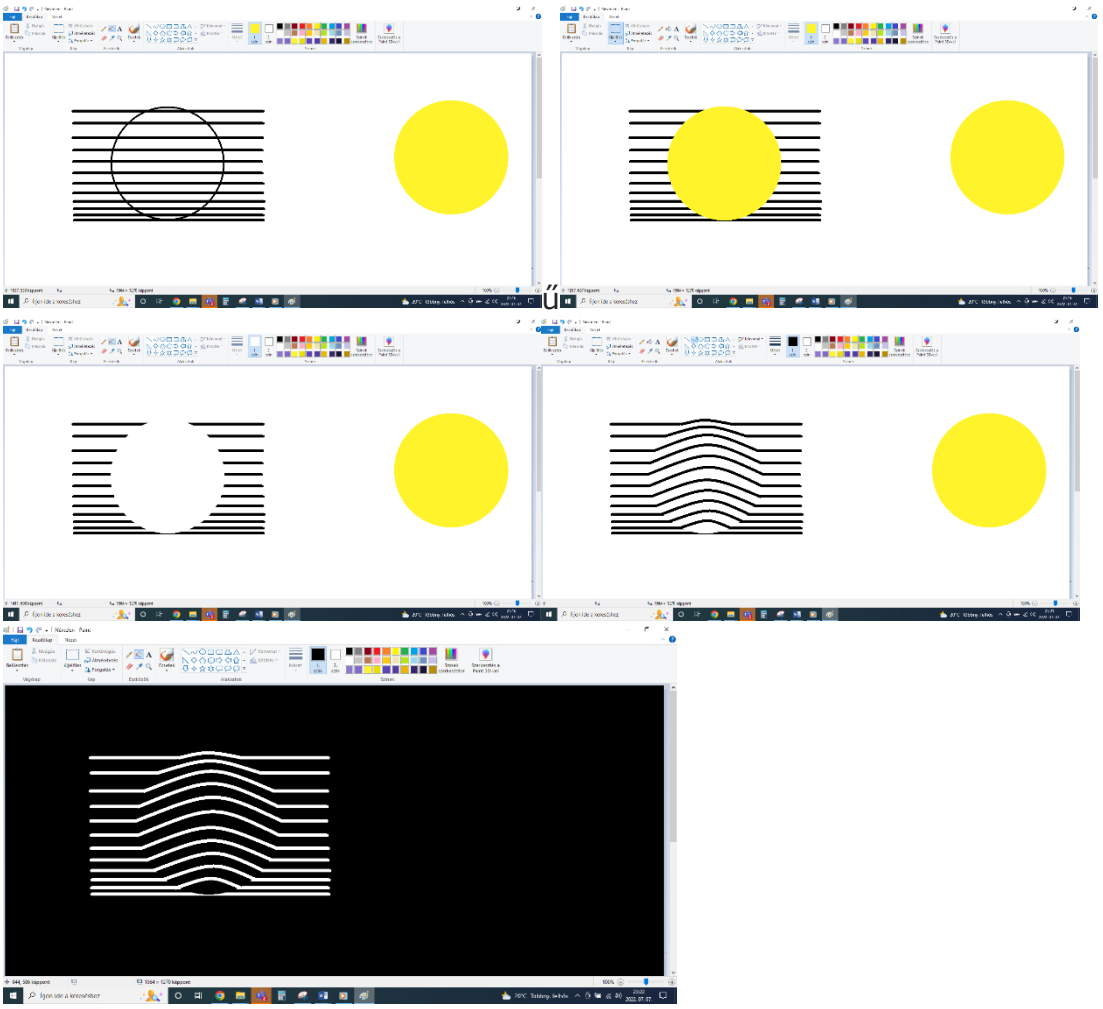
Lesson plan - lesson 5

Tasks of the lesson:

- Exploring the work of Vasarely and Andrade
- gathering experience on the possibilities of spatial representation
- representation of a spatial surface made up of curved lines
- graphics software: line and curve drawing, line and curve properties, curve bending, curve setting, copy settings, eraser function

Time	Activity	Methods	Goals	Tools
3'	Introduction	frontal	inspiration	pictures from the image collection, internet, albums, projector
5'	Search the internet for works by Vasarely and Andrade where curved lines are used to depict spatiality	pair work, internet research, slide show	enriching knowledge of art history, creating a collection of images, inspiration	computer, internet
25'	Drawing graphics inspired by the collected paintings	individual work	Basic IT skills (ellipse, line, drawing a curve, shaping the curve, eraser, filling in), developing creativity, creating a product	computer, graphics software
5'	upload graphics to the common google form	collaborative work on an internet platform	IT skills enhancement (google form), assessment ahead of time	computer, internet
7'	evaluation of the works created, end of lesson	voting, group discussion	self-assessment, evaluating each other, highlighting positives, discussing mistakes	computer, internet projector





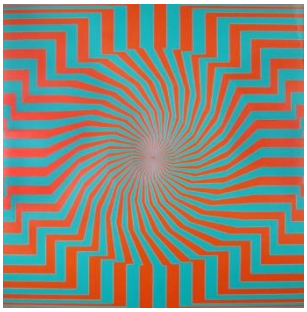
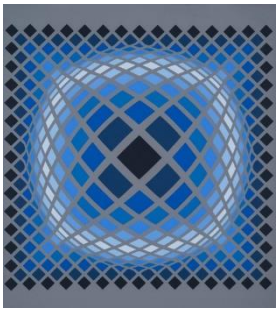
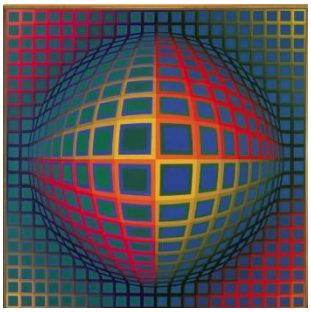
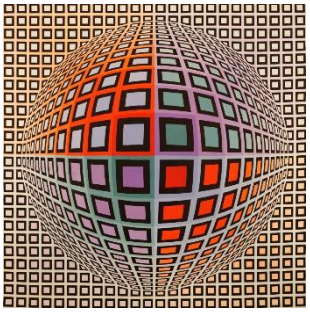
Lesson plan - lesson 6

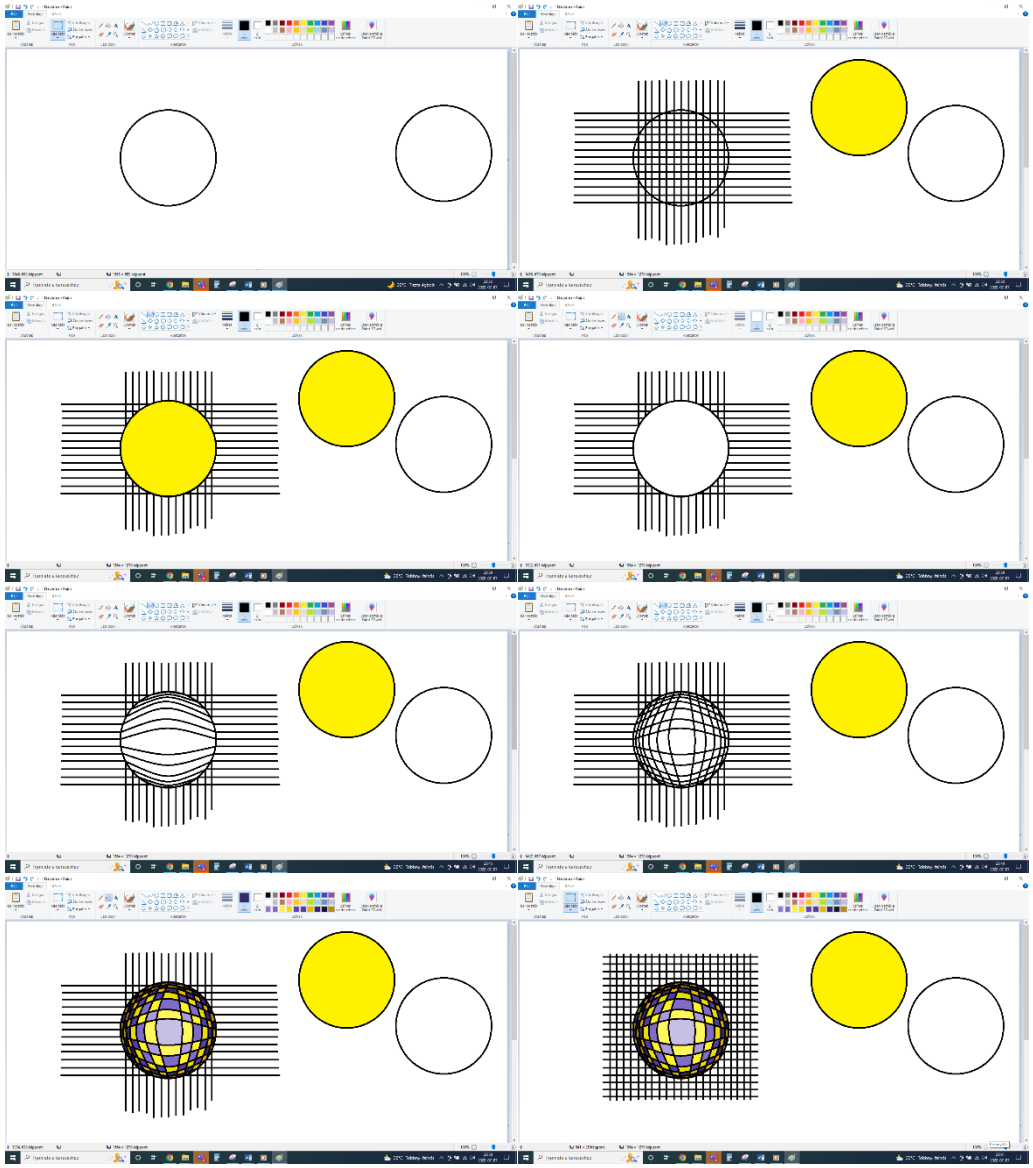
Tasks of the lesson:

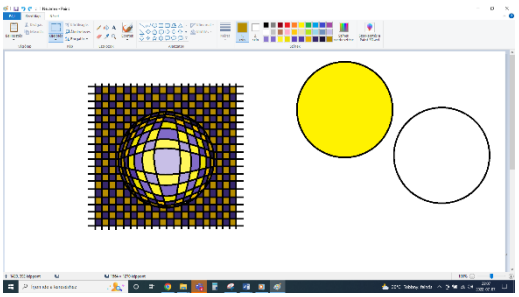
- Exploring the work of Vasarely and Andrade
- gathering experience on the possibilities of spatial representation
- deepening the representation of the spatial surface made up of curved lines, complementing what has been learned about the effect of colour shades in supporting spatial representation
- graphics software: line and curve drawing, line and curve properties, curve bending, curve setting, copy settings, rotate, mirror, eraser, fill, colour tones

Time	Activity	Methods	Goals	Tools
3'	Introduction	frontal	inspiration	pictures from the image collection, internet, albums, projector
5'	Search the internet for works by Vasarely and Andrade where curved lines are used to depict spatiality	pair work, internet research, slide show	enriching knowledge of art history, creating a collection of images, inspiration	computer, internet
25'	Drawing graphics inspired by the collected paintings	individual work	basic IT skills (ellipse, line, drawing a curve, shaping the curve, rotating, mirroring, eraser, filling, colour shades), developing creativity, creating a product	computer, graphics software
5'	upload graphics to the common google form	collaborative work on an internet platform	IT skills enhancement (google form), assessment ahead of time	computer, internet
7'	evaluation of the works created, end of lesson	voting, group discussion	self-assessment, evaluating each other, highlighting positives,	computer, internet projector

			discussing mistakes	



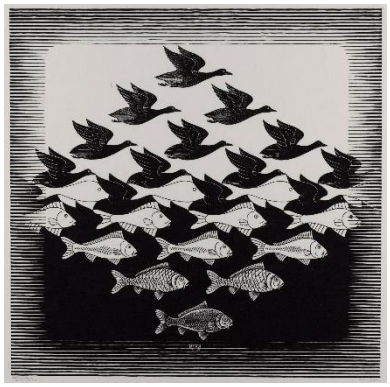


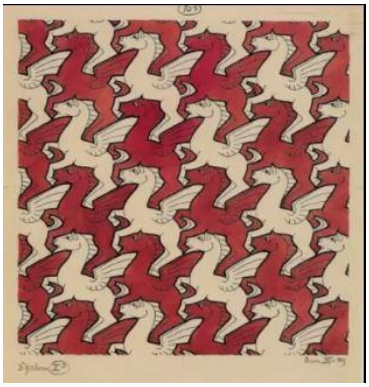
Lesson plan - lesson 7

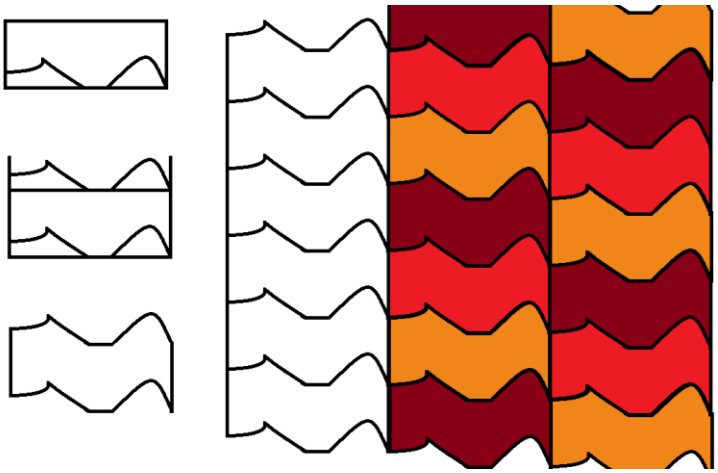
Tasks of the lesson:

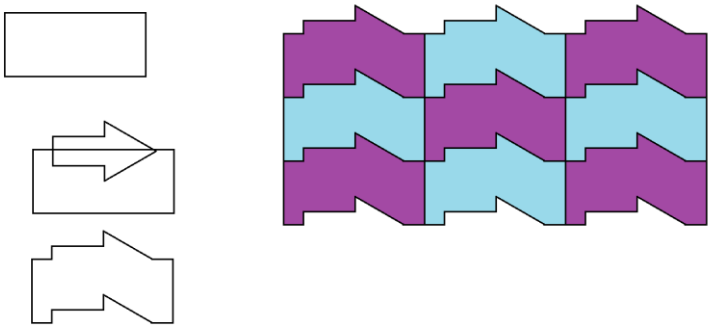
- Exploring the work of Maurits Cornelis Escher
- properties of mosaics, parquetry in mathematics
- graphics software: rectangle application, curve drawing, copy, decision, eraser, fill, colour shades

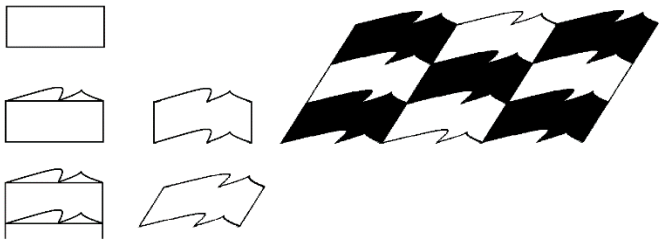
Time	Activity	Methods	Goals	Tools
8'	Introduction, followed by an introduction to the Escher mosaics, an overview of mathematical parquetry	frontal, projection, passing around an album, etc.	inspiration	pictures from the image collection, internet, albums, projector
15'	Researching and collecting information on Escher's oeuvre on the internet	pair work, internet research	enriching knowledge of art history, making a portrait gallery. Learning about new types of optical illusions	computer, internet https://hu.wikipedia.org/wiki/Maurits_Cornelis_Escher
18'	Drawing simple mosaic graphics inspired by Escher mosaics	frontal work	Strengthening basic IT skills (using a rectangle, drawing a curve, copying, deciding, eraser, filling in, colour shades), developing creativity, creating a product	computer, graphics software
4'	Evaluation of works created, end of lesson	group discussion	self-assessment, evaluating each other, highlighting positives, discussing mistakes	computer, graphics software, projector









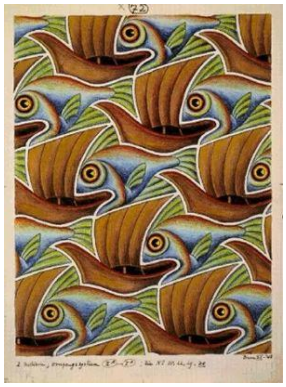


Lesson plan - lesson 8

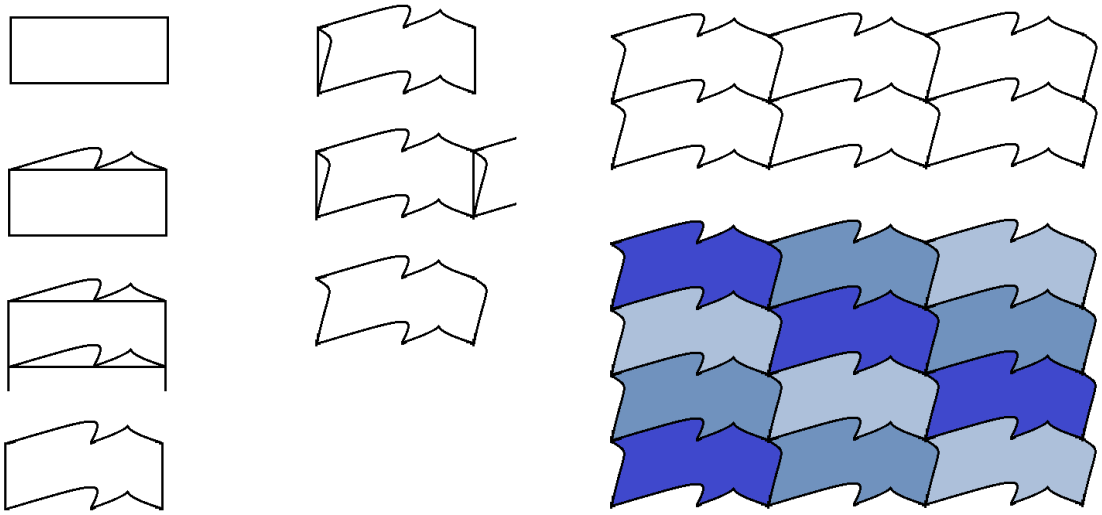
Tasks of the lesson:

- Exploring the work of Maurits Cornelis Escher
- properties of mosaics, parquetry in mathematics
- developing creativity
- graphics software: rectangle application, curve drawing, copy, decision, eraser, fill, colour shades

Time	Activity	Methods	Goals	Tools
5'	Introduction, followed by an introduction to the Escher mosaics, an overview of mathematical parquetry	frontal, projection, passing around an album, etc.	inspiration	pictures from the image collection, internet, albums, projector
30'	Drawing complex mosaic graphics inspired by Escher mosaics by copying, deciding, sketching	frontal introduction, followed by individual work	Strengthening basic IT skills (using a rectangle, drawing a curve, copying, deciding, eraser, filling in, colour shades), developing creativity, creating a product	computer, graphics software
10'	Evaluation of works created, end of lesson	group discussion	self-assessment, evaluating each other, highlighting positives, discussing mistakes	computer, graphics software, projector




Escher's tessellation scheme, applied to animal-like figures, brings life and movement to geometric forms
4 of 7

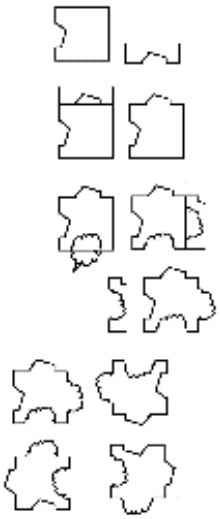


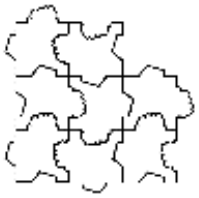
Lesson plan - lesson 9

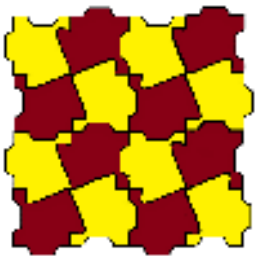
Tasks of the lesson:

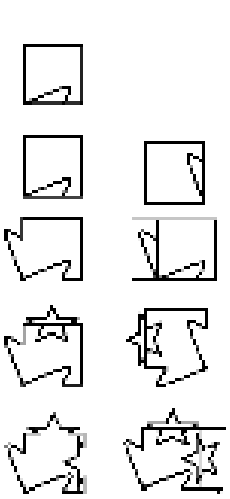
- Exploring the work of Maurits Cornelis Escher
- properties of mosaics, parquetry in mathematics
- rotation and mirroring features
- developing creativity
- graphics software: rectangle application, curve drawing, copy, decision, eraser, fill, colour shades

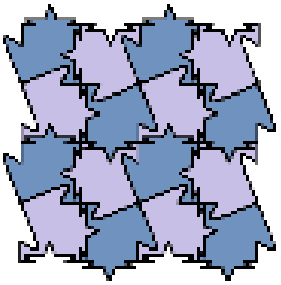
Time	Activity	Methods	Goals	Tools
3'	Introduction, followed by an introduction to the Escher mosaics, an overview of mathematical parquetry	frontal, projection, passing around an album, etc.	inspiration	pictures from the image collection, internet, albums, projector
10'	Search the internet for Escher mosaics made by rotation or mirroring	pair work, internet research, slide show	enriching knowledge of art history, creating a collection of images, inspiration	computer, internet
23'	Drawing complex mosaic graphics inspired by Escher mosaics by copying, rotating, mirroring, sculpting	individual work	Reinforce basic IT skills (using rectangle, drawing curve, copying, deciding, rotating, mirroring, eraser, filling, colour shades), develop creativity, create a product	computer, graphics software
4'	Evaluation of works created, end of lesson	group discussion	self-assessment, evaluating each other, highlighting positives, discussing mistakes	computer, graphics software, projector









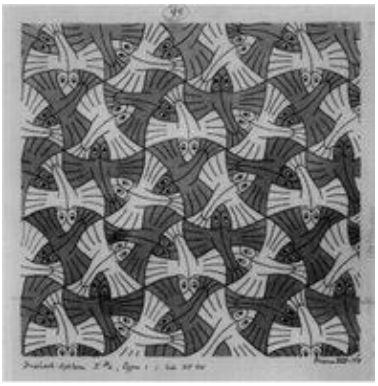


Lesson plan - lesson 10

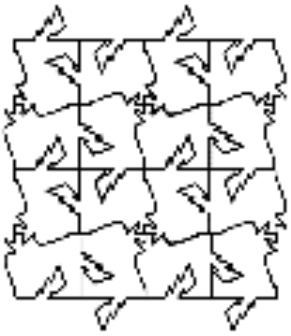
Tasks of the lesson:

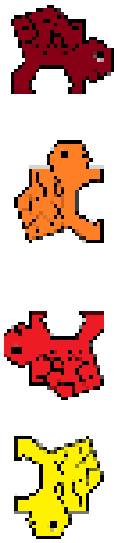
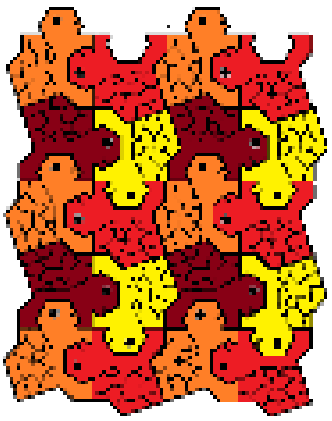
- Exploring the work of Maurits Cornelis Escher
- properties of mosaics, parquetry in mathematics
- rotation and mirroring features
- developing creativity - drawing living things by adding abstract shapes
- graphics software: rectangle application, curve drawing, copy, decision, eraser, fill, colour shades

Time	Activity	Methods	Goals	Tools
3'	Introduction, followed by an introduction to the Escher mosaics, an overview of mathematical parquetry	frontal, projection, passing around an album, etc.	inspiration	pictures from the image collection, internet, albums, projector
32'	Drawing mosaic graphics inspired by Escher's mosaics, using mosaics of living creatures by copying, rotating, mirroring, sculpting	individual work	Reinforce basic IT skills (using rectangle, drawing a curve, copying, deciding, rotating, mirroring, eraser, filling in, colour shades), develop creativity, create a product	computer, graphics software
10'	Evaluation of works created, end of lesson	group discussion	self-assessment, evaluating each other, highlighting positives, discussing mistakes	computer, graphics software, projector





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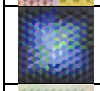
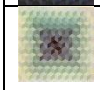
	Victor Vasarely:Ion 11	https://www.muo.cz/en/victor-vasarely-new-acquisitio n-ii--769/
	Victor Vasarely:Ion 3	https://www3.gobiernodecanarias.org/medusa/ecoescuela/recursosdigitales/2015/03/21/los-cubos-de-victor-vasarely/
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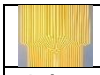	Edna Andrade: Orange cizoid	https://www.wikiart.org/en/edna-andrade/orange-cisoide-1971
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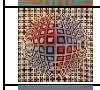
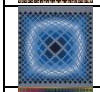
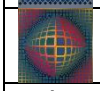
	Victor Vasarely: Vega anneaux	https://www.fondationvasarely.org/en/cell-6/
	Victor Vasarely: Hommage á Bartók	https://mng.hu/mutargyak/bartoknak-vasarely/
	Victor Vasarely: Vega nor	https://funiq.hu/2523-vasarely-m%C3%BAzeum-p%C3%A9cs
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