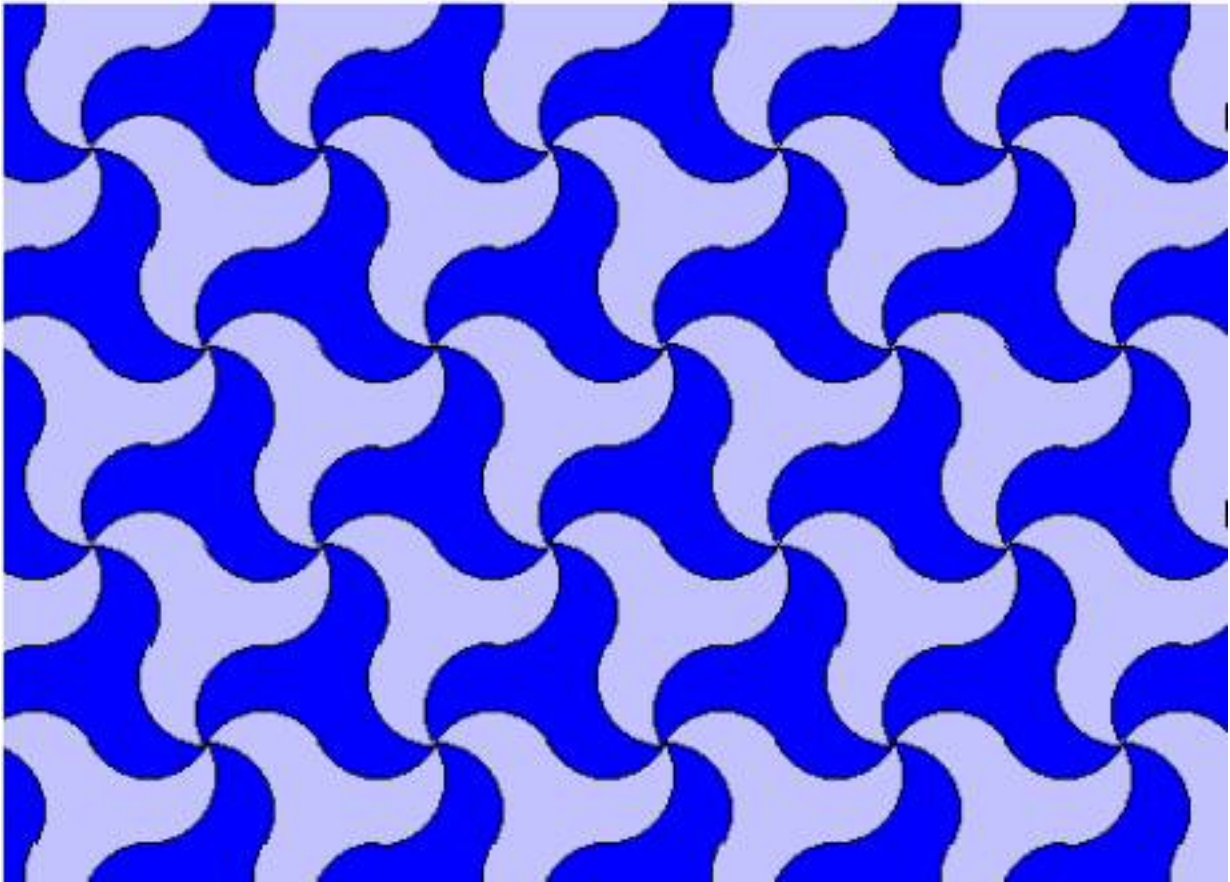


Tessellation

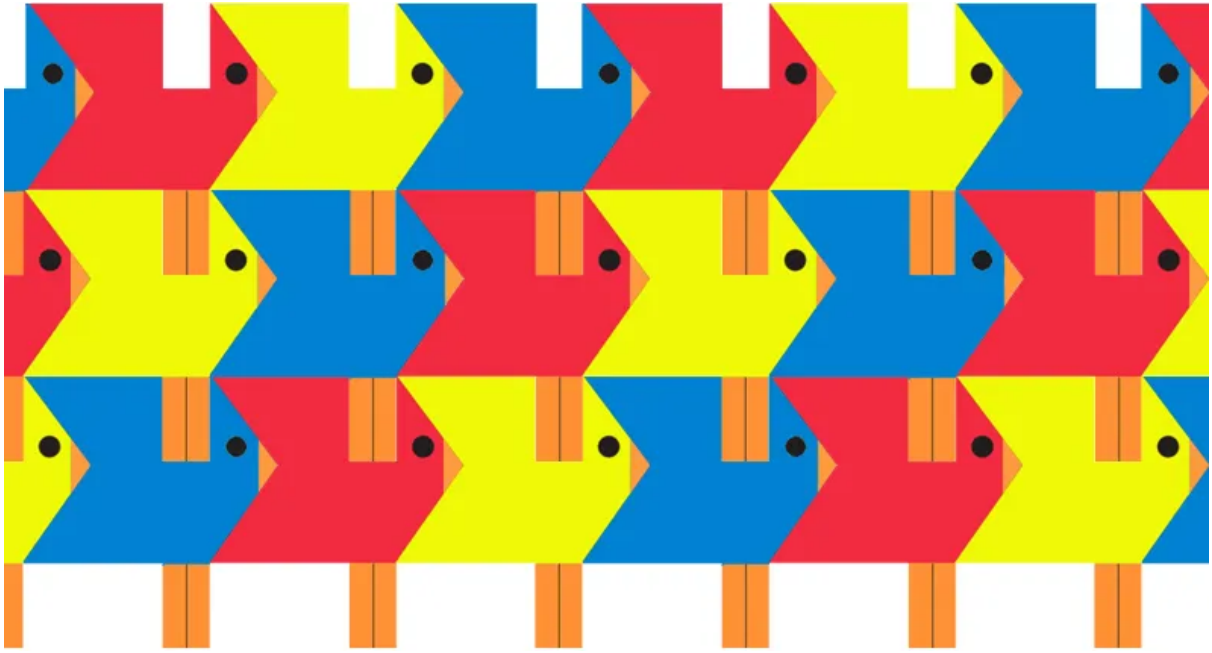
I n t e g r a t i o n	21st Century Theme: General Knowledge		
	Concepts for STEAM Disciplines	Mathematics Isometry	Science Education ----
		Technology GeoGebra design	Art Design
	<p>Prerequisite Knowledge</p> <p>Mathematics Regular polygon Reflection (respect to line, respect to a point) Translation Rotation</p> <p>Information Technologies Use multimedia resources for learning purposes. Basic use of GeoGebra.</p> <p>Arts -</p>		
	<p>Learning Outcomes</p> <p>Grade Level: 13-14 years old Activity duration: 300 minutes</p> <p>Learning Outcomes for Mathematics Students are able to recognize and implement the isometries.</p> <p>Learning Outcomes for Information technologies Students are able to design a video using the proper software. Students are able to create an animation to show an idea. Students are able to use GeoGebra.</p> <p>Learning Outcomes for Arts Students are able to use art elements and design principles while creating the tiles and tessellation.</p>		
R e a l L i f e S i t u a t i o n	<p>Problem Situation Let's create a new and original design for the school floor. For practicality, we can only use a single kind of tile.</p>		
	<p>Materials</p> <ul style="list-style-type: none"> ● Computer ● Cardboard ● Rule ● Compass ● Scissors ● Scotch tape 		
	<p>Preparation for the lesson Answers will be sought to the following questions:</p> <ul style="list-style-type: none"> ● What is a tessellation? ● How to design a tile? ● What/ which isometries can be found in a tessellation? <p>Some pictures will be printed by the teacher before the lesson and hung on the classroom walls, doors, windows, cabinets, clipboards, etc.</p>		

	<p>Resources</p> <p>https://www.geogebra.org/m/atnyuskv https://www.geogebra.org/m/h4fhfej3 https://www.geogebra.org/m/ksbedtfv https://www.geogebra.org/m/gt8vwpkx https://youtu.be/k6shIU6y9Ik https://youtu.be/9UPgnUo8PEY https://youtu.be/E-LnvaQml8Q https://youtu.be/cvn5ozlCwBQ</p>
<p>S T E A M A c t i v i t y</p>	<p>Ask</p> <p>The lesson begins by watching a video about tessellation. The video gives students an idea of what is a tessellation. The teacher starts the video (https://youtu.be/k6shIU6y9Ik).</p> <p>After watching the video, the teacher asks the students the following questions:</p> <ul style="list-style-type: none"> ● What is a tessellation? ● Do you know some tessellations related to art? ● Where did you see it? ● Do you know how to create a tessellation? ● What regular polygons tessellate the plane? <p>Research</p> <p>The teacher suggests the links provided to students so they can interact with the GeoGebra applets (https://www.geogebra.org/m/atnyuskv; https://www.geogebra.org/m/h4fhfej3; https://www.geogebra.org/m/ksbedtfv; https://www.geogebra.org/m/gt8vwpkx). The applets show how to create a tile to make a tessellation starting with a regular polygon. The students can research more GeoGebra applets related to tessellation on www.geogebra.org.</p> <p>Imagine</p> <p>The teacher will organise a discussion time in which students report about the research. They will explain:</p> <ul style="list-style-type: none"> ● which regular polygon tessellates the plane ● how you can create a tile starting from a regular polygon ● can give some examples ● what isometries can be involved in a tessellation <p>By having the group discussion, they synthesise their thoughts and information and they will be split into groups of two or three students.</p> <p>Plan</p> <p>Students are asked to design a tile from a regular polygon. They will construct in cardboard a regular polygon to tessellate the plane. After that, they can use the strategies viewed to create their tile. At this stage, the student can use scissors and scotch tape. The physical tile helps the visualisation. They can make more than one tile but it is not necessary. It is recommended that students use only straight lines to create the tails. It will be easier to create the model in GeoGebra. Once they create the tile on the cardboard they will start to create the model in GeoGebra. Students should create the tile in a GeoGebra file. They can start creating the polygon that is their tile or they can reproduce the whole creative process as is shown in the GeoGebra files recommended for the research stage. After that, they have to use the isometries tools provided by GeoGebra to create the tessellation with their tile. In this process, students are expected to cover most of the graphics view or the teacher can decide on the area to cover in advance.</p> <p>Create</p> <p>The groups create a video of a screen recording showing the necessary movements to create a full tessellation. They can use some of GeoGebra's tools to change the aesthetic aspects of the tiles. The teacher should encourage the students to create the most attractive tessellation to show.</p> <p>Test</p> <p>A show for the school will be organised where students will expose the videos and the cardboard tiles.</p> <p>Improve</p> <p>The students can create the tiles with GeoGebra and then use a 3D printer to print several tiles and create 3D tessellations.</p>

Other resources:



http://platea.pntic.mec.es/~anunezca/experiencias/experiencias_AN_0203/web_taller_0203/mujeres/sara/mosaicos.htm



<https://www.actiludis.com/2015/12/11/creacion-de-mosaicos-por-traslacion-o-rotacion/>



<https://www.alhambra-patronato.es/geometria-matematica-alicatados>