Europeana Learning Scenario

Title

Symmetries in Floral Ornaments of Art Nouveau

Author(s)

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Summary

We live surrounded by symmetry in nature, crafts, arts of cultures worldwide... We can find symmetric designs in ornaments of Art Nouveau design. But what exactly means a symmetry of a figure? And how to classify objects according to their symmetry? Students can use the figures of Europeana art design to create a poster or digital content to explain, identify and classify symmetries. Optionally, they can use those friezes patterns or rosettes to draw a wallpaper with GeoGebra, Sketchup or hand drawing. The final product could be an exhibition or a Padlet with their findings and research. They could add some information about the Art Nouveau movement to complete their research. The final products could be an important resource for other students to learn more about symmetry subject.

Table of summary	
Subject	*Mathematics, Art and ICT*
Topic	*The main topic is about Mathematic more specifically to study symmetries in rosettes, friezes or patterns*
Age of students	*12- 15*
Preparation time	*1 Session for coordination of teachers*
Teaching time	*Pre-requisites: Students knows about the key concepts, proprieties, and performances of the four Isometries (Reflection, Rotation, Translation, and Glide reflection).* *5 Mathematic Sessions (Presentation of interdisciplinary project, selecting images, studying symmetries and organizing information, creating posters or digital content, evaluation of the activity).* *2 Technology Sessions (Enrich the investigation creating applications with GeoGebra or Sketchup).* *2 Art Sessions (Information about the Art Nouveau movement, optionally using the Europeana images and the findings of the investigation to create, design or adorn objects).*
Online teaching material	*Ted lessons about symmetry* https://ed.ted.com/lessons/the-science-of-symmetry-colm-kelleher *Friezes in "azulejos"* https://www.youtube.com/watch?v=FLJ0GT_eAwE *Each one of the seven frieze groups symmetries* https://www.youtube.com/watch?v=u34SOPeFNOA *Stamping a rosette* https://www.youtube.com/watch?v=qscfwKPcNOM *Stamping a frieze* https://www.youtube.com/watch?v=5omITmscNvU *Stamping the plane* https://www.youtube.com/watch?v=E69KrNrj4KQ *Paint or similar to draw or edit images* *Geogebra* https://www.geogebra.org/ *Geogebra symmetry* https://www.geogebra.org/t/symmetry *SketchUp online* https://app.sketchup.com/app *Introducing to SketchUp* https://www.youtube.com/watch?v=RJtSeS5zcgI *Google Forms* https://www.google.com/forms/about/ *This will be used to group work.*

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	Any software to produce an infographic or a poster: PowerPoint, Canva, etc. *Padlet https://padlet.com/ Online platform where students can share ideas about the work they will create.* *Mentimeter https://www.mentimeter.com for feedback.* *21 CLD Student work rubrics https://education.microsoft.com/GetTrained/ITL-Research*
Offline teaching material	*Text book, paper, colored pencil, glue, etc.* *Computer, internet access*
Europeana resources used	*Floral Ornaments of Art Nouveau* *https://www.europeana.eu/portal/pt/search?q=what%3A%22floral%20ornaments%22&view=grid* *Art Nouveau: Drawings of plants and ornaments* *https://pro.europeana.eu/data/art-nouveau-drawings-of-plants-and-ornaments*

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Integration into the curriculum

This lesson could be used in Mathematics or as an interdisciplinary project (Math, Art, ICT, History, Science,…).

Mathematics: Using figures of Europeana art design to create a poster or digital content to explain, identify and classify symmetries.

Technology: Enrich the investigation creating applications with GeoGebra or Sketchup.

Arts: Explaining Art Nouveau movement; optionally using the Europeana images and the findings of the investigation to create, design or adorn objects.

Aim of the lesson

The aim of this Learning Scenario is to produce a poster or digital content to explain, identify and classify symmetries using rosettes, friezes or patterns of Art Nouveau designs ornaments.

Optionally they could create applications (with Geogebra or Sketchup) or design/adorn objects to illustrate and enrich their findings.

Trends

Students as Creators: students become more active producers and publishers of educational resources.

Collaborative Learning: a strong focus on group work.

STEAM Learning: Increased focus on Science, Technology, Engineering, Arts, Mathematics subjects in the curriculum

21st century skills

1. Content knowledge and 21st century themes: This learning scenario focuses on Mathematics, ICT and Arts, to promote an understanding of academic content by weaving interdisciplinary themes.

2. Learning and Innovation Skills: Students need to collaborate, have critical thinking, being creative and innovative to explain the concepts and to produce the required poster or digital content.

3. Information, Media and Technology Skills: In this project, students have to use ICT tools to research, organize, create and present their findings.

4. Life and Career Skills: Students have to produce a product, respect deadlines, collaborate with a team and know how to explain their ideas. These activities are important to develop thinking skills, content knowledge, and social and emotional competencies.

Activities

Describe here in detail all the activities during the lesson and the time they require. Remember, that your learning scenario needs to use Europeana resources.

Name of activity	Procedure	Time
1) Inspire and prepare (Mathematic)	*Teacher inspires students to the main topic (Symmetry in nature, crafts, arts of cultures worldwide...), presents the main ideas of the LS, negotiates the assessment criteria with students and presents the Europeana portal (explain how to search for information).* *Students form small teams (2 or 3 per group), discuss the roles and responsibilities and post a presentation of the group on the Padlet wall.*	*50 min*
2) Explore and organize (Mathematic)	*The students' teams explore and research the subject (to explain, identify and classify symmetries), they select images from Europeana (Art Nouveau) and organize their findings. They could use the Padlet to post and share their work. They must pay attention to copyright issues regarding the data they collect.*	*50 min*
3) Make a draft (Mathematic)	*Each team as to create a poster or digital content, explaining the symmetries in the images. They have to edit images, create movements, effects, etc. They have to be creative to explain the concepts. They could use the Padlet to post and share their work.*	*100 min*
4) Enrich the investigation (ICT)	*The students' teams could enrich the investigation creating applications with GeoGebra or Sketchup. These applets could be embedded in the poster or collected in the Padlet wall.*	*100 min*
5) Enrich the investigation (Art)	*Students have to search for the Art Nouveau movement to complete their research to relate the images to the heritage. Optionally they could use their findings to create, design or adorn objects.*	*100 min*
6) Present and evaluate	*Each team has to post and share their work in the Padlet wall and present the results of their work to the all class. During the presentation, the peers will evaluate the other teams work using an online response system, like Mentimeter. They also do a self- evaluation based on rubrics.*	*50min*

Assessment

Assessment	% final mark	5	4	3	2	1
Collaboration (team work) observation	*30%*	*Students are sharing responsibility fairly* *They are making substantive decisions together* *Their work product is interdependent.* *(Collaboration: Student Work Rubric)*	*Students are sharing responsibility fairly* *They are making substantive decisions together* *But their work product is not interdependent.* *(Collaboration: Student Work Rubric)*	*Students are sharing responsibility fairly* *But they are not making substantive decisions together.* *(Collaboration: Student Work Rubric)*	*Students are working together* *But they are not sharing responsibility fairly.* *(Collaboration: Student Work Rubric)*	*Students are not working together in pairs or groups.* *(Collaboration: Student Work Rubric)*
Knowledge Construction (team work) observation	*40%*	*The student's main effort was knowledge construction* *The work does demonstrate conceptual understanding* *And students did apply their knowledge or the work is interdisciplinary.* *(Knowledge Construction: Student Work Rubric)*	*The student's main effort was knowledge construction* *The work does demonstrate conceptual understanding* *But students did not apply their knowledge and the work is not interdisciplinary.* *(Knowledge Construction: Student Work Rubric)*	*The student's main effort was knowledge construction* *But the work does not demonstrate conceptual understanding.* *(Knowledge Construction: Student Work Rubric)*	*It shows that the student interpreted, analyzed, synthesized, or evaluated information or ideas.* *But the student's main effort was not knowledge construction.* *(Knowledge Construction: Student Work Rubric)*	*The work shows only that students reproduced information or used familiar procedures.* *(Knowledge Construction: Student Work Rubric)*
Use of ICT for Learning (team work) observation	*30%*	*Student work demonstrates use knowledge construction supported by ICT* *The ICT was required for constructing this knowledge* *Students designed a product that demonstrates attention to authentic users in its design.* *(Use of ICT for Learning: Student Work Rubric)*	*Student work demonstrates knowledge construction supported by ICT* *The ICT was required for constructing this knowledge* *But students did not design an ICT product for authentic users.* *(Use of ICT for Learning: Student Work Rubric)*	*Student work demonstrates knowledge construction supported by ICT* *But students could have constructed the same knowledge without using ICT.* *(Use of ICT for Learning: Student Work Rubric)*	*Students used ICT* *But the work does not demonstrate knowledge construction supported by ICT.* *(Use of ICT for Learning: Student Work Rubric)*	*Student work does not demonstrate ICT use.* *(Use of ICT for Learning: Student Work Rubric)*

********** AFTER IMPLEMENTATION **********

Student feedback

Use Mentimeter for feedback from peers at the end of Group Presentation. It could be use a google forms to ask students to provide a feedback about the work developed and what they think about using the Europeana for this type of research. Important also to ask students how this activity was important concerning their learning and knowledge acquirement. They could make a video or record audio using the Padlet applications and post on the group mural.

Teacher's remarks

Based on students' feedback the teacher should reflect as a strategy to improve future activities. For the accomplishment of this activity, it has been important all the previous preparation of the review of the contents. The students have organized the information and created the poster without difficulty. It was important to have provided guidance for the work to be done. The time spent was adequate. It was a good method to apply the concepts studied, using real and contextualized images. The students learned to think about the concepts to apply them to new situations. This activity with Europeana was interesting for students.

About the Europeana DSI-4 project

Europeana is Europe's digital platform for cultural heritage, providing free online access to over 53 million digitised items drawn from Europe's museums, archives, libraries and galleries. The Europeana DSI-4 project continues the work of the previous three Europeana Digital Service Infrastructures (DSIs). It is the fourth iteration with a proven record of accomplishment in creating access, interoperability, visibility and use of European cultural heritage in the five target markets outlined: European Citizens, Education, Research, Creative Industries and Cultural Heritage Institutions.

European Schoolnet (EUN) is the network of 34 European Ministries of Education, based in Brussels. As a not-for-profit organisation, EUN aims to bring innovation in teaching and learning to its key stakeholders: Ministries of Education, schools, teachers, researchers, and industry partners. European Schoolnet's task in the Europeana DSI-4 project is to continue and expand the Europeana Education Community.