

# Europeana Learning Scenario

## Title

Optical Instruments throughout History

## Author

Elena Vladescu

## Summary

Optical instruments played an important role in science throughout the history of humanity. So, what better place to study optics origins than Europeana Collections? In this learning scenario, students will discover information about optical instruments by using this digital library and they will create new content starting from Europeana cultural heritage repository.

### Table of summary

Subject	Physics, Mathematics, Biology, ICT
Topic	Optical instruments
Age of students	12-18
Preparation time	4 hours
Teaching time	2 didactical hours
Online teaching material	Web tools: Brainstorming: <a href="https://answergarden.ch/">https://answergarden.ch/</a> eBooks: <a href="https://www.canva.com/create/ebooks/">https://www.canva.com/create/ebooks/</a> Interactive story telling: <a href="http://twinery.org/">http://twinery.org/</a> Sticky notes: <a href="http://en.linoit.com/">http://en.linoit.com/</a> Tagging images: <a href="https://www.thinglink.com/">https://www.thinglink.com/</a> Infographics: <a href="https://www.easel.ly/">https://www.easel.ly/</a> Assesment: <a href="https://create.kahoot.it/login">https://create.kahoot.it/login</a>
Offline teaching material	learning journals



## Europeana resources used

Eye: <http://bit.do/eNvbW> , <https://www.europeana.eu/portal/record/9200579/m8saym43.html>  
 camera: <https://www.europeana.eu/portal/ro/record/2021657/162086.html?q=camera#dclid=1554395513074&p=1>  
 Lenses: <https://www.europeana.eu/portal/ro/search?q=lens%20discovery&view=grid>  
 Magnifier glass: <http://bit.do/eNvcU> , <https://www.europeana.eu/portal/ro/search?q=magnifier&view=grid>  
 Telescope: <https://www.europeana.eu/portal/ro/record/9200579/b57yapkn.html?q=astronomical+telescope#dclid=1554394732300&p=1> , <https://www.europeana.eu/portal/ro/search?q=telescope&view=grid> , <http://bit.do/eNve2>  
 Microscope: <http://bit.do/eNvd6> , <https://www.europeana.eu/portal/record/9200579/ywv2397q.html> , <https://www.europeana.eu/portal/ro/search?q=microscope&view=grid>  
 Binocular: <https://www.europeana.eu/portal/record/2021657/113008> , <https://www.europeana.eu/portal/ro/search?view=grid&q=binocular>

## Licenses

Attribution ShareAlike CC BY-SA. Images and media licensed individually.

## Integration into the curriculum

This lesson is integrated in the chapter on optics for secondary level. This learning scenario fit into the Romanian national curriculum for Physics and Science, as follows:

- In 6<sup>th</sup> grade (12-13 years old) pupils study light reflection and refraction (experimental approach);
- In 8<sup>th</sup> grade (13-14 years old) pupils study light reflection and refraction, lenses, the eye, the magnifier glass and eyeglasses;
- In 9<sup>th</sup> grade (14-15 years old) pupils study camera and the microscope;
- In 11<sup>th</sup> grade (16-17 years old) pupils study binoculars and the telescope.

The new Romanian national curriculum for lower secondary level is more based on scientific investigation, discovery and on PBL approach, so, this LS is fitting very well.

## Aim of the lesson

By the end of the lesson, students will:

- learn about the principle of optical instruments;
- learn about the use of digital cultural heritage in STEM education;
- discover the characteristics of optical instruments.

## Trends

List the relevant trends that the lesson incorporates: <http://www.allourideas.org/trendiez/results>

**Project based learning, STEM learning, mobile learning, peer learning**

## 21<sup>st</sup> century skills

1. Critical Thinking and Problem Solving: students have to analyse and solve a real-world problem

2. Collaboration: students have to work in a team and come up with a solution to a problem
3. Creativity and Innovation: pupils have to create something new starting from cultural heritage items
4. Communication: every team use oral and written communication skills to present their findings to peers
5. Media and ICT Literacy: students learn to use media and ICT tools in order to present their work

## Activities

Name of activity	Procedure	Time
<b>Introduction</b>	<p>The teacher presents the essential question of the lesson:  <i>At what stage would humanity now be without the discovery of optical instruments?</i></p> <p>He/she makes a short introduction on Europeana Collections as a useful resources archive for learning.</p> <p>Teacher may use a “Think-Pair-Share” brainstorming activity aiming at introducing the topic and raising awareness regarding optical instruments importance.</p> <p>Students are asked to write down their ideas about the question in their personal learning journal.</p>	10 min
<b>Preparation</b>	Teacher split the students in groups of four. Each group has a type of optical instrument to research.	5 min
<b>Group work</b>	<p>Each group is provided with a description of the work and they have to use Europeana Collections to search image.</p> <p>Each group needs to produce posters, infographics or similar using Europeana Collections resources. The outcome of their group work has to represents key features, pros and cons about given type of optical instrument. After that each group has to present final work to their classmates.</p>	40 min
<b>Presentation-Feedback</b>	All teams present their work to their peers. Classmates give comments and/or suggestions. Final works of every group can be printed for an awareness exhibition for the whole school.	30 min
<b>Evaluation</b>	Kahoot quiz for evaluation: <a href="https://create.kahoot.it/share/optical-instruments/c8a69bc1-d706-4255-8d70-47ce2e3e9be1">https://create.kahoot.it/share/optical-instruments/c8a69bc1-d706-4255-8d70-47ce2e3e9be1</a>	15 min

## Assessment

After doing the work, the students are asked to say briefly if they liked the lesson, what they found difficult and what part was the most interesting for them. Teacher use also a Kahoot quiz for evaluation: <https://create.kahoot.it/share/optical-instruments/c8a69bc1-d706-4255-8d70-47ce2e3e9be1>

Questions (10)

Q1:What is the ability of the eye to focus the image of an object at different distances?

Contraction

This is a wrong answer

Accommodation

This is a correct answer

Optical Power

This is a wrong answer

Reflex

This is a wrong answer

Q2:The use of microscopes is...

20 sec

to see cells and viruses

This is a correct answer

to capture images

This is a wrong answer

to see stars

This is a wrong answer

to see your neighbour

This is a wrong answer

Q3:Which of these in another optical instrument?

20 sec

paper

This is a wrong answer

computer

This is a wrong answer

binocular

This is a correct answer

Astigmatism

This is a wrong answer

Q4:What is the name of this optical instrument?

20 sec

kaleidoscope

This is a wrong answer

telescope

This is a correct answer

microscope

This is a wrong answer

camera

This is a wrong answer

Q5:What type of lens is a Magnifying Glass?

20 sec

mirror

This is a wrong answer

divergent

This is a wrong answer

microscope

This is a wrong answer

Convergent

This is a correct answer

Q6:An optical instrument that makes small objects look bigger that our eye can see them.

20 sec

Magnifying glass

This is a wrong answer

Microscope

This is a correct answer

Telescope

This is a wrong answer

Lenses

This is a wrong answer

Q7:It is a type of telescope that is build with large mirrors to capture much light as possible.

20 sec

Reflecting Telescope

This is a correct answer

Radio Telescope

This is a wrong answer

Refracting Telescope

This is a wrong answer

Infrared Telescope

This is a wrong answer

Q8:What kind of optical instrument is in the picture?

20 sec

microscope

This is a wrong answer

Camera

This is a correct answer

magnifier glass

This is a wrong answer

telescope

This is a wrong answer

Q9:What part of your body does optics require the most?

20 sec

eyes

This is a correct answer

ears

This is a wrong answer

nose

This is a wrong answer

hands

This is a wrong answer

Q10:All are optical instruments except...

20 sec

Camera

This is a wrong answer

Microscope

This is a wrong answer

Binoculars

This is a wrong answer

Electroscope

This is a correct answer

Resource credits

Description: <https://www.europeana.eu/portal/en>

\*\*\*\*\* AFTER IMPLEMENTATION \*\*\*\*\*

### Student feedback

*Students agreed that the lesson was interesting. They liked the possibility of using new applications and they were very positive about the resources of the Europeana Collection. They appreciated also that the materials were available in the mother tongue, not only in English. They liked Kahoot evaluation, as always, because is interactive and fun.*

### Teacher's remarks

*After the implementation of this lesson, I can say it went well. I used the computer science lab. I advise you to check all computers and all apps in advance in order to be sure that everything it will go well, otherwise you can let students to continue their work at home.*

### 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.