

# Europeana Learning Scenario

## Title

**WATER IS LIFE: Give Life to The Future**

## Author(s)

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## Abstract

Water scarcity affects more than 40% of people worldwide. Global warming due to climate change increases this rate even more. One of the goals of Sustainable Development is that everyone has the right to access safe and accessible drinking water. Therefore, we must protect forests, mountains, wetlands and rivers. Our main goals are to raise awareness and inform about "Clean Water Sanitation" and "Climate Action", which are among the Sustainable Development goals. To create and spread this awareness, we will create a virtual exhibition using the Artsteps application.

Our water is contaminated with organic and inorganic substances. In this case, we will develop alternative water purification devices to clean dirty water. We will pay attention to the use of accessible materials in the product design process. We must raise awareness in order not to pollute wetlands and nature. In this context, they will be asked to create a virtual exhibition and presentation with the pictures, poems, short articles and photographs they create. We will share this exhibition on our school website and blogs.

As a result of this learning scenario, students are expected to recognize sustainable development goals, understand that protecting nature is everyone's duty, use technological tools, use computational thinking skills, and create a solution to a problem by creating peer collaboration.

Finally, students will use science for the knowledge phase, mathematics for water analysis, water treatment equipment engineering, and technology for studies. They will use arts and social sciences to spread this social event and raise awareness.

## Keywords

Global Warming, Wetlands, Pollutants, Virtual Exhibition, Water Treatment Equipment.

## Table of summary

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<b>Subject</b>	Science, Technology, Engineering, Maths, Art, Liberal Arts, CLIL.
<b>Topic</b>	Global Warming, Drought, Wetlands Cleanliness, and Awareness.
<b>Age of students</b>	11-15 ages.
<b>Preparation time</b>	3 hours



<b>Teaching time</b>	130 minutes (at home) 6 sessions of 40 minutes each (at school)
<b>Online teaching material</b>	<p><b>Digital Tools:</b> Symbaloo, Kahoot, Stop Motion Studio, Padlet, Artsteps, WhatsApp, PDF, Zoom.</p> <p><a href="#">Padlet / Discussion</a>  <a href="#">Our Exhibition/ Artsteps</a>  <a href="#">Symbaloo Link</a>  <a href="#">Water Cycle-Khan Academy</a>  <a href="#">Earth and Atmosphere-Khan Academy</a>  <a href="#">Inexhaustible Resource-Khan Academy</a>  <a href="#">Climate Joker-Khan Academy</a>  <a href="#">Limited Resources-Khan Academy</a>  <a href="#">Sustainable Development-Khan Academy</a>  <a href="#">25 Liters</a>  <a href="#">Meteorology</a>  <a href="#">Purification of Wastewater</a>  <a href="#">KYOTO Protocol</a>  <a href="#">Kahoot!</a>  <a href="#">Sustainable Development Goals Article</a></p>
<b>Offline teaching material</b>	<p><b>To create dirty water:</b> Water, oil, detergent.</p> <p><b>For Water Quality Determination:</b> 3 beakers, 3 thermometers, water analysis kit (tablet for dissolved oxygen, turbidity meter, pH).</p> <p><b>For Water Purifier:</b> Plastic bottles, cotton or cloth, charcoal or activated carbon, sand, small stones, grass or moss, beaker, clay, coffee filter paper or gauze, silicone glue (Students will be asked to choose from these materials. can be done.)</p> <p><b>For Virtual Exhibition:</b> Crayon, A4 paper, scissors, camera, smart board.</p>
<b>Europeana resources used</b>	<p><a href="#">Rain Gauge</a>  <a href="#">Oxygen Analyzer</a>  <a href="#">Water Pollution</a>  <a href="#">Pollution 2</a>  <a href="#">Pollution 3</a>  <a href="#">Oceanic Climate Studies</a>  <a href="#">Endangered Species</a>  <a href="#">Oily Water Treatment of Polypropylene Bags</a>  <a href="#">Hendrick Avercamp</a></p> <p><b>Images for the virtual exhibition:</b>  <a href="#">Postcard of the Krka Waterfall</a>  <a href="#">Lake in a Swiss Park</a>  <a href="#">Clouds</a></p>

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## Integration into the curriculum

**Science:** Learns the Sustainable Development goals. Learns the concepts of global warming, drought, and the water cycle. Discusses the causes and possible consequences of global climate change.

**Technology:** Recognizes and uses digital tools. (Symbaloo, Padlet, ArtSteps, Kahoot, Stop Motion, WhatsApp, Textäventyr (Text Adventure)). Uses computational thinking skills to solve a problem.

**Engineering:** Uses engineering design processes in the development of water treatment equipment (Ask, Research, Imagine, Plan, Create, Test, Improve).

**Maths:** Uses the logical inquiry process in the analysis of the data obtained while creating the observation report. Uses mathematical operations to determine dissolved oxygen in the water in water quality determination.

**Art:** Draws pictures, writes poems and short articles on the theme of "Global Warming, Drought and Wetlands" in creating a virtual exhibition. Takes impressive photos.

**Liberal Arts:** Recognizes and gains awareness of a problem that concerns society. (Global Warming, Drought and Protection of Water Resources)

**CLIL:** Uses English words in videos to be prepared using Stop Motion Studio and exhibition application.

## Aim of the lesson

### Primary Purposes:

- Recognizes the Sustainable Development goals and gains awareness. Uses engineering design skills and computational thinking skills in solving a problem. It gains awareness about social events and focuses on producing solutions.

### Secondary Purposes:

- Knows the concepts and causes of global warming and drought. It produces solutions.
- Learn about and apply water purification.
- Understands the importance of cleaning wetlands for aquatic life.
- Uses scientific research processes using variables (dependent, independent, control). Uses digital tools and engineering design processes.
- Improves language skills.

## The outcome of the lesson

As a result of this course, students gain awareness about sustainable development goals and global warming. They produce solutions. Students use digital tools and improve their competence in the face of

social events. They develop creativity, communication, collaboration, and critical thinking skills. By working from home, they will take control and responsibility for their learning, thereby developing their learning autonomy. When distance education takes place, they will gain experience of learning at home. They will write poems and short articles using information available on the Internet. As a result, they will create and spread a virtual exhibition. They will reflect on the protection of wetlands. They will design a vehicle using engineering design skills. They will use the dimensions of abstraction from logical inquiry, problem-solving skills, parsing, and numerical thinking skills. They will enrich their learning process by integrating multiple disciplines.

## Trends

**Flipped Classroom: students master basic concepts of the topic at home. Time spent in the classroom is used to reflect, discuss, and develop a topic.** The stages of cognition and comprehension (global warming, drought, pollutants, water treatment...) included in the Bloom taxonomy will be carried out at home, learning at the metacognitive level will be carried out in the school.

**STEM Learning: Increased focus on Science, Technology, Engineering, Mathematics subjects in the curriculum.** It will use the achievements of science, technology, engineering, and mathematics in the water treatment device development process. Social sciences and art will be used in the dissemination and awareness phase.

**Peer Learning: Students learn from peers and give each other feedback.** The responsibility of home learning rests mostly with students. Parents and teachers are guides. They interact with their peers online during home learning. For school activities, they perform interactive learning using Padlet and WhatsApp. They use social events in the dissemination phase.

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

- Information, Media and Technology Skills (Information, media and ICT Literacy)
- Social and Intercultural Skills (Awareness and community benefit)
- Responsibility (themselves responsible for their learning at home. Acts as a leader in collaborative work when necessary)
- Learning and Innovation Skills (Critical Thinking and Problem Solving, Communication and Cooperation). Uses problem-solving and engineering skills in problem-solving. Communicates with peers and looks for solutions by thinking critically.

## Activities

I taught my lesson using the Flipped Classroom Learning Model. Some of this model is processed offline and some online. In the Flipped Classroom Learning Model, students take responsibility. Parents and teachers are guides. They follow the process. In this context, the content I uploaded to Symbaloo should be watched at home. Weekends were preferred for this period. In the school, only activities for the metacognitive level were carried out during the week for 5 days.

The Scientix Resources pool is used for this scenario.

[Scientix Resources 1](#)

[Scientix Resources 2](#)

Name of activity	Procedure	Time
<b>Flipped Classroom 'Learning at Home' Process</b>		
<b>Introduction</b>	<p>At this stage, students watch the content prepared by the teacher at home. The prepared contents were added to the <b>Symbaloo</b> application. The teacher sends the link to the assignment via WhatsApp to the students. (These contents are given in order and this order must be followed.) Padlets will be used for students' discussions at home. Finally, with <b>Kahoot</b>, students are evaluated at home.</p> <p><a href="#">Symbaloo Link</a> There are 12 connections at the address.</p>	
<b>1. Content</b>	National Geographic Turkey "25 Liters" Documentary is watched. This documentary is about 54 minutes long and is for attention.	55'
<b>Contents 2-7</b>	Content with Khan Academy lecture videos	40'
<b>8. Content</b>	Waste Water Treatment Documentary	10'
<b>9. Content</b>	An article on Global Warming and Climate	5'
<b>10. Content</b>	KYOTO Protocol	5'
<b>11. Content</b>	Sustainable Development Goals	5'
<b>12. Content</b>	Kahoot - Students are evaluated at home with questions on the topic.	10'
<b>Flipped Classroom 'Learning at School' Stage</b>		
<p><b>Discussion-</b></p> <p><b>Reinforcing what we have learned at home</b></p>	<p><a href="#">Rain Gauge</a>  <a href="#">Oxygen Analyzer</a>  <a href="#">Water Pollution</a>  <a href="#">Pollution 2</a>  <a href="#">Pollution 3</a>  <a href="#">Hendrick Avercamp</a></p> <p>Pictures of Europeana sources are shown.            -What do you think these images could be? Can you explain its relation to our topic?            -Do you think we can drink the water that our ancestors drank 500 years ago?            - What are the Sustainable Development Goals?            The information they have learned at home is examined with their questions.            -Can I have your thoughts on the 25 Liter documentary you watched?</p>	15'
<b>Giving the Research Problem</b>	<p>You learned the information part of the subject at home. Time to consolidate and apply what we have learned at school! We will carry out this stage in groups.</p> <p>You have learned that the water on earth constantly changes state that water evaporates into the air, forms clouds and condenses, and returns to the earth in</p>	5'

Name of activity	Procedure	Time
	<p>the form of rain. What if he can't go back? Reasons such as the development of technology and rapid population growth were causing contamination of wetlands. We will research this. We will test the hypothesis that <b>"waste materials in water affect the water cycle"</b>.</p>	
<b>Practice (Control Experiment)</b>	<p>Prepare 3 beakers and 3 thermometers, oily and detergent water. The monitoring report is presented in Annex-1. The data will be recorded for 5 days at the same time. Water level and water temperature will be recorded daily. (At this stage, students start controlled experiments. 0.5 L of water is put into 3 beakers. There is only water in 1 beaker as in the control group. Detergent is added to one of 2 beakers, the other is added to the experimental group).</p>	40'
<b>Creating Artistic Activities</b>	<p>(They are expected to write poems, short articles, draw pictures and take photographs on the theme of "Global Warming-Drought and Wetlands" while recording the observation results during the 5 days they will spend at school. For our virtual exhibition)</p> <p>Fram Strait Acoustic Monitoring for Oceanic Climate Studies: a workshop report is reviewed. 25-26 September 1996 <a href="#">Oceanic Climate Studies</a></p> <p>Endangered Plant and Animal Gallery <a href="#">Endangered Species</a></p> <p>In this section, students are asked to take advantage of digital tools. Short articles, cloud formation animations, poems, pictures and photos are prepared with <b>Stop Motion Studio Animation</b>. A virtual exhibition is created with the <b>Artsteps</b> application. English words will be used while preparing the videos.</p> <p><i>Wastes on the water surface prevent the evaporation of water. Because there is no evaporation, precipitation falls. Drought increases. Since the water cannot evaporate, its temperature increases. The amount of dissolved oxygen in hot water decreases. This situation negatively affects aquatic life.</i> <i>As a result of global climate change, glaciers melt, sea level rises, some regions are flooded, some plants and animals become extinct, and agricultural products decrease.</i></p>	40'
<b>Testing the Hypothesis</b>	<p>At this stage, the students compare the data in the observation report with the groups. The temperature of the water is measured with a thermometer. The materials in the water analysis kit are used following the instructions. Dissolved oxygen analysis:</p> <ol style="list-style-type: none"> <li>1. 10 ml of sample is taken into the sample container or test tube.</li> <li>2. Add 8 drops of Dissolved Oxygen-A reagent, 8 drops of Dissolved Oxygen-B</li> </ol>	30'

Name of activity	Procedure	Time
	<p>reagent, the precipitate is formed.</p> <p>3. Add 8 drops of Dissolved Oxygen-C reagent and shake, dissolve the precipitate.</p> <p>4. Add 8 drops of Dissolved Oxygen-D reagent, shake it and the color becomes blue-black.</p> <p>5. Titrate the sample with Dissolved Oxygen-E Titrant until it is colorless, the number of drops is recorded.</p> <p><b>Dissolved Oxygen (ppm) = Dissolved Oxygen-E Titrant Drop Number x 0.5.</b></p> <p>The water quality analysis report is given in <b>Annex-2.</b></p> <p>"Waste materials in water affect the water cycle." The hypothesis would be tested. The water treatment process starts for this.</p>	
<p><b>Generating a Solution (Waste Cleaning Phase)</b></p>	<p>Application of waste polypropylene bags as filter media in binders for oily water treatment</p> <p><a href="#">Oily Water Treatment of Polypropylene Bags Article</a></p> <p>An article was given on the subject.</p> <p>At this stage, students are asked to create a water purification device by choosing among plastic bottles, cotton or cloth, charcoal or activated carbon, sand, small stones, grass or moss, beaker, clay, coffee filter paper or gauze, silicone adhesive materials. The best water purification device will be selected. The criteria are given in Annex 3.</p>	<p>40'</p> <p>+</p> <p>40'</p>
<p><b>Results</b></p>	<p>Photographs, padlet speeches, presentation, virtual exhibition and stop motion studies are given in <b>Annex-6.</b></p>	

### Assessment

The Flipped Classroom is a learning model that takes place both at home and at school. Solves the contents of the Symbaloo application and the questions of the Kahoot application at the information acquisition stage.

[Kahoot](#) (Questions)

AFTER APPLICATION

Rubric (**Annex 3**)

Self-Assessment (**Annex 4**)

Peer Review (**Annex 5**)

### Student feedback

Students tried a different learning method with the Inside Flipped Classroom. This was a different experience for them. They took the responsibility of learning the information part of the subject. There was no problem with that. They were able to use digital tools. While watching the content, they easily asked and discussed the questions they wondered through the padlet. Students' participation in a discussion and activities provided constant feedback for the teacher. They stated that they liked the activities very much. Especially the virtual exhibition we made with the Artsteps application was a very different experience for them. They learned the use of Europeana Collections and used ICT tools. They used the method of trial and error when designing their purification devices. They tried to extract the cleanest water. For this purpose, they applied the steps of the research method. They tested the hypothesis. They tried to create the best tool at this stage where peer communication was intense. They learned the English equivalent of scientific concepts with their studies.

### Teacher's remarks

This learning scenario is suitable for the 11-15 age range. The scenario consists of 2 parts as home and school stages. Studies are general and can be deepened according to student level. We worked with 11-12 age group students. At first I thought it was complicated. However, as the students deepened their knowledge, they enjoyed doing the applications. Work in the learning scenario is suitable for liberating students. In the study we conducted according to the Flipped Classroom Learning Model, the students carried out the stage of acquiring information at home with their families. In the meantime, we used applications such as WhatsApp and Padlet. We talked about general issues and plans on WhatsApp. We had scientific discussions in Padlet. At this stage, the students did not experience any difficulties. I observed that they understood the content. In the 6 sessions we spent at the school, students made artistic works for the exhibition. This episode was fun. They also created polluted waters. In this work, they took on the task of cleaning the water we polluted. While making water purification devices here, they created tools suitable for their level. Created products can be enriched as levels change. In this sense, the scenario is completely student-centered. In this study, we had difficulty using digital tools. Information-media literacy expected from students and their effective use of digital tools. In this context, we had difficulty using our virtual exhibition application Artsteps. Additional time was given to them to learn. They easily learned and enjoyed the Stop Motion application. I think it is effective in helping students gain responsibility skills.

### About the Europeana DSI-4 project

[Europeana](#) is Europe's digital platform for cultural heritage, providing free online access to over 53 million digitized 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 organization, 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.

**Annex**
**ANNEX 1- 5-day OBSERVATION**

DAYS	WATER TEMPERATURE (°C)	WATER LEVEL (L)
MONDAY	24.5	0.5
TUESDAY	24.6	0.5
WEDNESDAY	24.8	0.48
THURSDAY	25.2	0.47
FRIDAY	25.5	0.465

**ANNEX 2 DETERMINATION OF WATER QUALITY MONITORING REPORT**

WATER ANALYSIS	
DISSOLVED OXYGEN (ppm)	4
TURBIDITY (JTU)	40
pH	6
COLOR OF WATER	Turbid

### ANNEX 3- PRODUCT EVALUATION RUBRIC

**Criteria: The water is clear, the additional materials to be chosen are useful and cheap and can be used in daily life.**

CATEGORIES	4	3	2	1	POINT
<b>Design Modeling and Material Usage</b>	The materials were used correctly and their visuality was enriched with creative applications.	The material has been used correctly, visuality has been improved.	The given materials were not used in sufficient quantity and with care.	The materials were not used adequately and correctly in creating products.	
<b>Cost calculation</b>	The product has been produced at an affordable cost. Compatible with the calculation made during the design process and the total cost at the end of the project	The designed product was presented at an affordable cost. The total cost at the end of the project can be accepted with the calculation made during the design process.	The designed product was presented at an affordable cost. The calculation made during the design process and the end of the project cost are incompatible.	The product is not cost-effective.	
<b>Compliance with the criteria</b>	All the required criteria are met.	Most of the requested criteria are met.	There are deficiencies in the requested criteria.	Does not meet the criteria.	

<b>Originality</b>	The product contains creative ideas.	The product contains some original ideas.	The product met the guidelines, but its creativity was limited	The given instructions have been violated.	
<b>Usability in daily life</b>	It is suitable for use in daily life and product sufficiency is ensured.	It is suitable for daily use.	Usability in daily life is limited.	It can not be used in daily life.	
<b>Presenting the product</b>	Detailed information about the product was given and an effective presentation was made.	Detailed information about the product was given and the presentation was made.	The information given about the product is sufficient and the presentation has been made.	The information given about the product is insufficient.	

#### ANNEX 4- ÖZ DEĞERLENDİRME

**This form has been prepared to assess yourself. Write the statements that reflect your work most accurately.**

1- What did I learn in this activity?
2- What did I do well, why?
3- In which subjects did I have difficulties, why?
4- Where did I need help?
5- In which area should I improve myself more?
6- What will I do differently in future studies?

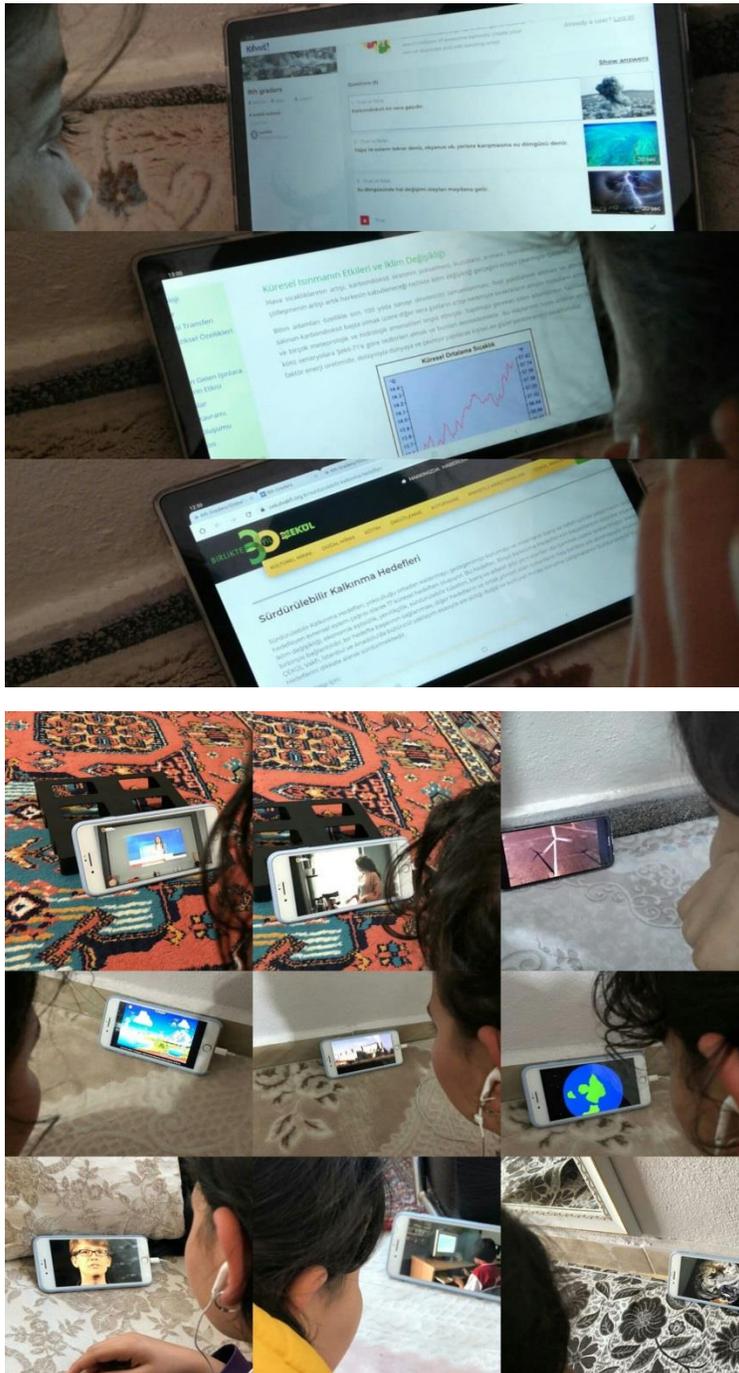
### ANNEX 5- PEER EVALUATION FORM

This form has been prepared to evaluate your work in the group. Fill in the form to get the views of your friends. If your answer to the questions is yes, write "Y", sometimes "S", if no, "N".

COMPETENCY	... according to my friend me	...according to my friend me	...according to my friend me	....according to my friend me	....according to my friend me
Volunteer participates in the studies.					
He shares what he knows with his friends.					
He fulfills his task.					
He is respectful of the opinions of his friends.					
Speaks without offensive in discussions.					
Participates in the division of labor within the group.					

ANNEX 6

Flipped Classroom 'Learning at Home' Photos



Our Virtual Exhibition:

[Our Exhibition/ Artsteps](#)

Our Padlet Speeches:

[Padlet / Discussion](#)

The presentation we prepared:

[WATER IS LIFE: Give Life to The Future/PDF](#)

Zoom Meeting:



Water Quality Analysis and Treatment Devices Photos:











**Stop Motion Studio Application Videos:**



StopMotionStudio2.mp4



StopMotionStudio1.mp4