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e. Programmes the school is participating in (Eco-Schools/LEAF/YRE/other)	LEAF
f. Would you like to receive monthly updates through our Newsletter? Yes/No	Yes
g. Submission date (dd/mm/yyyy)	28/06/2023

THE LESSON PLAN

A. Theme

Circular Economy- Bioeconomy-Case Study: Olive Tree

B. Introduction -

The lesson plan is about the circular economy-bioeconomy in relation to the olive tree, a common tree of Mediterranean. As the use of olive products is part of the children's daily life, it is

understood that we can use all the by-products of the tree, without destroying it, helping to reduce waste and turning it into useful other products.

C. Age Group

Age 9 to 11

D. Objectives or Learning Outcomes

The importance of the circular economy in reducing waste to improve the environment.
The relationship of waste reduction and conversion with economic progress.
The necessity of the circular economy to mitigate Climate Change.
Establishing simple everyday practices to reduce waste.

E. Time required to deliver the lesson plan

The time required to complete the lesson plan is between 8-10 lesson hours. (8x45 minutes)

F. Remote preparation

Collection of fallen and dry olive leaves

Collection of products from the olive tree

Box construction (by the teacher)

Kettle and glasses for making olive tea

Materials for experiments with oil: Alcohol, Paper towels, clear container, stirrer

G. Planning considerations

It must be made clear to the students that we will not deal with the olive tree by using it in a way that can be damaged.

Lighting the olive pits can be problematic in terms of fumes and for safety reasons it is best to do it out of class.

H. Resources Required to deliver the lesson plan

The equipment required is very easy to find either from the school (A4 cardboard), or from the students' families (olive oil soap, olive leaves for a drink) without high cost.

I. Activity

a. Introduction

Experiential experience: Observing the olive trees in the school yard and collecting fallen dry olive leaves.

Painting of olive trunks using the method of imprinting them on transparencies.

Creations of olive trees with a collage of leaves and fruits.

b. Development

1. Search of olive products by students in supermarkets. Collection in a special box: "The Circular Economy Box - Olive Tree".

2. Familiarity with olive products with all the senses

3. Discussion

4. Watch a video on the use of olive pits as biofuel.

5. Visit to the National Archaeological Museum: Observing the clay containers for preserving and transporting olives and olive oil. Discussion on the olive and its products as objects of exchange of goods. (Barter economy)

6. Experiments with oil-water-alcohol

7. Online visits to two olive museums:

a. Museum of Industrial Olive Production of Lesbos

<https://www.piop.gr/el/diktuo-mouseiwn/Mouseio-Biomixanikis-Eleourgias/to-mouseio.aspx> and

b. Olive and Greek Oil Museum of Sparta.

<https://www.piop.gr/el/diktuo-mouseiwn/Mouseio-Elias-Kai-Ellinikou-Ladiou/to-mouseio.aspx>

and studying material (after arranging to send educational material to the school)

8. Observation of famous olive-themed paintings.

9. Creation of poems on the subject of the olive tree.

10. Monitoring of an online distance learning program from the Education Centre for the Environment and Sustainability of Kalamata (KEPEA Kalamata) entitled: "The Circular Economy of the Olive Tree"

11. Student's interviews with specialist scientists, invited to the class: a) Geologist and b) Forester.

12. Create a poster-game about the circular economy, the olive tree and the Sustainable Development Goals.

The poster game was created as an idea in the experiential workshop on the Circular Economy - Bioeconomy organized by GenB in collaboration with the Hellenic Society for the Protection of Nature entitled "Common Ground Camp: Co-creating new approaches to teaching, raising awareness and disseminating the bioeconomy" on 21 -22/2/2023 in Athens

13. Group Reading of the first Circular Economy-Bioeconomy book "Us and the Bioeconomy" for children. The book is a creation of the Italian group that is a partner of the GenB project and has been published in several languages, but not commercially.

14. In collaboration with the company "Think Green" (a company active in the collection and conversion of frying oils into biodiesel) carrying out an action at the school to collect frying oil from students of all classes. For this purpose, each class studied the educational material from the Centre for Education for the Environment and Sustainability (KEPEA) of Eleftherios Kordelios: a) Small classes: "Frying oil and its recycling" and b) Large classes: "Why recycling frying oils?" Frying oil recycling and the 17 Goals of Sustainable Development".

15. At the end all the children created individual or group posters that they placed in the classrooms, in the hallways, in the courtyard and outside the school to inform and raise awareness at the neighbourhood and the parents.

c. Conclusion

The students with experiential activities and actions as well as watching educational programs, videos etc. they learned about the olive tree and the circular economy, i. e. how all these products of a tree can, with proper processing, be transformed-transformed into useful materials so that nothing is lost or nothing becomes useless waste that pollutes the planet.

The connection of the circular economy with the Sustainable Development Goals such as Goal 12: Responsible Consumption and Production, Goal 9: Industry, Innovation and Infrastructure, Goal 1: Zero Poverty, Goal 13: Climate Action, Goal 15: Life on Land and Goal 3: Good Health and Well Being, shows that the shift of Society to the Circular Economy is the only way to ensure the continuity of all life on the planet.

J. Evaluation and Assessment

Students understood the concept of circular economy-bioeconomy.

They learned about the reuse and conversion of materials-products.

They realized that our actions affect the sustainability of the planet.

They adopted good circular economy practices in their daily lives.

Worksheets:

a. "Which products can we use with conversion-processing from the olive tree?"

b. Research group assignment: "Find a natural product that can be used as a case study for the circular economy".

Project presentation in class.

K. Dissemination

The lesson plan was implemented.

It was disseminated throughout the school community, parents and the local community.

1. It was shared on the school website <http://1dim-n-ionias.att.sch.gr>
2. In a magazine kept by the class in the Panhellenic School Network:
<https://schoolpress.sch.gr/1dimnioniaatt/> <https://schoolpress.sch.gr/1dimnioniaatt/?p=1952>
3. Greek Language Video English Language Video:
<https://drive.google.com/file/d/1HCuq81teQTf3-bwRpKuWvqbvIbg4uTC7/view>
4. Greek Language Video:
https://drive.google.com/file/d/1RtY9m_hs06L3oGeZgeSUJ5hT4QjkeQHn/view
5. Video promoting the circular economy-Bioeconomy for Education in collaboration with the Hellenic Society for the Protection of Nature(HSPN) and WaysTUP! (Project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No. 818308):
<https://youtu.be/25Dz30EK-jE>
6. And a small promotional video for the class project:
<https://www.facebook.com/100011775787105/videos/878813933185570/>
7. It was finally submitted as a good practice to the Office for Climate Education (OCE) as a result of a collaboration to promote Climate Change Education in schools.

L. Follow-up activity

Students can nominate a frying oil collector at school.

Frying oil collection can help the school in the context of the remunerative economy, that the collection companies rely on, so it will lead to a long-term financial benefit for the school, which benefit will be translated into logistical infrastructure.

It can also lead to the purchase of olive trees (if the school yard space allows), so that the children can harvest their own olives and make various products from them.

M. Adaptations for students with learning difficulties

The lesson plan, because it includes a wide range of experiential activities, is absolutely suitable for all students, enhancing different types of intelligence and therefore different skills.

N. Extension for gifted students

The lesson plan provides an opportunity for students with enhanced capabilities to extend the topic – case study “The Olive Tree” to other cases of materials, natural or artisans that can be used in the circular economy.

Especially for students who may be involved with new technologies, this topic can become an occasion to create digital games on the computer or using their knowledge in robotics to build machines that facilitate the processing of products in order to promote the circular economy.

O. Background information for teachers

1. For more information you can see the previous article "Climate Change, Circular Economy and Bioeconomy - Learning through scientific experiments, observations and games"
<https://schoolpress.sch.gr/1dimnioniaatt/?p=1911>

2. Soap Friday - Centre for the Environment and Sustainability of Krestena:
<https://schoolpress.sch.gr/1dimnioniaatt/files/2023/04/Paraskevi-sapounion.pdf>

3. Frying oils:

<https://schoolpress.sch.gr/1dimnioniaatt/files/2023/04/Poia-einaita-ta-tiganelaia.pdf>

<https://schoolpress.sch.gr/1dimnioniaatt/files/2023/04/%CE%A4%CE%99-%CE%93%CE%99%CE%9D%CE%95%CE%A4%CE%91%CE%99-%CE%A4%CE%9F-%CE%A4%CE%97%CE%93%CE%91%CE%9D%CE%95%CE%9B%CE%91%CE%99%CE%9F-%CE%9C%CE%95%CE%A4%CE%91-%CE%A4%CE%97-%CE%A7%CE%A1%CE%97%CE%A3%CE%97-%CE%A4%CE%9F%CE%A5-1.pdf>

4. The historical relationship of man with soap - Centre for the Environment and Sustainability of Krestena:
<https://schoolpress.sch.gr/1dimnioniaatt/files/2023/04/H-historiki-sshesi-tou-anthropou-me-to-soap.pdf>

P. References

1. Circular Economy - Bioeconomy - Young bio voices for a sustainable future
<https://www.genb-project.eu/>
2. Education Center for the Environment and Sustainability (KEPEA) of Eleftherios Kordelios:
a) 1st-3rd Grade: "Frying oil and its recycling"
[https://schoolpress.sch.gr/1dimnioniaatt/files/2023/04/Frying Oil -Small-Classes.pdf](https://schoolpress.sch.gr/1dimnioniaatt/files/2023/04/Frying%20Oil%20-Small-Classes.pdf)

b) (4th -5th Grade): "Why recycling frying oils? The recycling of frying oils and the 17 Sustainable Development Goals"

<https://schoolpress.sch.gr/1dimnioniaatt/files/2023/04/Tiganelaiia-Megales-Taxes.pdf>

3. How we extracted the oil from the olive to our plate <https://youtu.be/3hIMEU6B9nE>
4. The olive and the oil <https://youtu.be/wi2Sk5c5j7I>
5. ASMR This is how I made a traditional olive oil <https://youtu.be/2qe2d21gqYQ>
6. Genius Makeup Tricks That Work Too Well <https://youtu.be/4RnDldkqUb4>
7. How to Produce Millions of Olive Soap Bar in Traditional Soap Factory – Olive Harvest and Processing <https://youtu.be/d0VrjluFqY8>
8. Biomass <https://youtu.be/wnlNdtmHySM>
9. Electricity and heating cogeneration unit using biomass | 10/05/2021 | ERT <https://youtu.be/wOFpvocoV0w>
10. Greece: Kalamata teaches ecological entrepreneurship in Europe! – business planet <https://youtu.be/SRdJG68jBLs>
11. Recycling Cooking Oil – From Frying Pan to Car | 22/03/2021 | National TV <https://youtu.be/mOnX4Rw8HuE>
12. Biofuels from the recycling of frying oils | 24/03/2022 | National TV <https://youtu.be/PFFJOrx0JPE>
13. Teganokinice – A schoolgirl's diary! AKTI Project and Research Centre <https://youtu.be/NK6dqyBUQdk>

websites

1. WaysTUP! <https://waystup.eu/>
2. Agroenergy www.agroenergy.gr/categories/%CE%B2%CE%B9%CE%BF%CE%BC%CE%AC%CE%B6%CE%B1
3. Ministry of Environment and Energy <https://ypen.gov.gr/energeia/ape/technologies/viomaza-vioefsta-vioaerio/>
4. "From the Sewerage of Chania to ...our Dish: Sewage Sludge and Cigarette Become biocarbon for Crops" <https://greenagenda.gr/%ce%b1%cf%80%cf%8c-%cf%84%ce%b7%ce%bd-%ce%b1%cf%80%ce%bf%cf%87%ce%ad%cf%84%ce%b5%cf%85%cf%83%ce%b7-%cf%84%cf%89%ce%bd-%cf%87%ce%b1%ce%bd>

Κυκλική Οικονομία-Βιοοικονομία

Μελέτη Περίπτωσης: Το ελαιόδεντρο



<https://schoolpress.sch.gr/1dimnioniaatt/?p=1952>

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