BLOOM Stories

Title of your Story of (Online) Implementation

Bioeconomy for a Sustainable Future

Name of the author(s)

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Category

Please indicate with an "X" which prize category you wish to enter. Note that each category is judged according to specific criteria (to be found on the competition page and in Terms and Conditions). Only one category should be selected.	X
1. Teaching with bioeconomy in primary schools (individual work)	X
2. Teaching with bioeconomy in secondary schools' STEM classes (individual work)	
3. Integrated STEM teaching with bioeconomy – collaborative teaching (teams of two STEM teachers of different subjects)	
4. Integrated STEAM teaching with bioeconomy – collaborative teaching (teams of up to three teachers of different subjects, including at least one STEM teacher and at least one non-STEM teacher)	

The BLOOM resource used

Please indicate with an "X" which BLOOM School Box resource you implemented online or in your class.	X
Bloom your school with your biofuel and soap lab	
Examining the thermal properties of bio-based building materials	
Building a new environmental Future	
Growing plastic and new life for plastic	
How poop will change the world	
Don't waste your waste! - Raising Bioeconomy awareness	X

bloom

Please indicate with an "X" which BLOOM School Box resource you implemented online or in your class.	X
Yeast, biofuels and novel biotechnology techniques'	
Let's talk about bioenergy and our lives!	
The benefits of composting – How we can produce organic fertilizer in our school garden	
Biofuel production from fruit waste	
Back to the Future	

Abstract

Please briefly summarise your (online) implementation (maximum 200 words). Note that this summary will be used to disseminate your work, so it should be concise and appropriately reflecting the content. Make sure to add up to 5 keywords that you think best describe your (online) implementation.

As a science teacher, I organized an online activity called "Bioeconomy for a Sustainable Future" with my students ranging in age from 9 years to 12 years. It happened between 06-19 April 2020. At the end of this activity, students were expected to learn the concept of bioeconomy and increase their awareness of bioeconomy. I believe that this awareness will have a great share in creating environmental awareness among students who will shape our future. I started my activity by introducing the concept of bioeconomy, a new concept for my students. I tried to draw attention by giving examples of the positive changes that can be achieved by using bioeconomy in our lives. To keep the attention and desire on the subject, I prepared videos, discussions, online educational materials, games, and experiments to prevent COVID-19 epidemics by preparing disinfectant from organic waste. As a result of all these entertaining activities, my students actively participated in the process, they now recognize the concept of bioeconomy and have contributed to bioeconomy by transforming the organic wastes created in their homes into new products that can be used. As a result of my student's feedback it is possible to see that they look at their environment from a different perspective, showing that this activity has reached its goal. Based on that, I can say I am more hopeful about the future.

Keywords: Sustainable future, Bioeconomy, Organic waste, Bio-product

The implementation context

Please briefly describe the context of your (online) implementation, specifying: what subject(s) you chose to implement the resource in, what are the students' ages, the size of the group, previous familiarity with bioeconomy activities etc. (maximum 200 words).
Please note that the competition looks to collect stories of (online) classroom implementation, so the context must appropriately reflect this.

The target group of this activity is composed of 40 gifted students, aged 9-12, who are trained in Eskişehir Emine Emir Şahbaz Science and Art Center. Science and Art Centers are institutions that do not apply the standard curriculum of other schools but use extra-curricular scientific and artistic activities that can reveal the interests and abilities of gifted students. In this context, I found it

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meaningful, for a sustainable future, to present my gifted students, at a young age, to the concept of bioeconomy, which is not included in the science curriculum. My activity is mainly based on the concept of bioeconomy. I tried to support the concept of bioeconomy with the concepts of fossil fuel, renewable energy sources, biological waste (organic waste), environmental pollution, and climate change. To make these concepts permanent in online activities, I used videos, games, and experiments with simple materials that can be found at home.

Your story

What did you do? Please describe how you used the BLOOM School Box in your teaching. For example, what was the structure of the session(s); did you make any adaptations to the resource? *If you are entering the competition in categories 3 or 4 (collaborative teaching), describe how you worked together with your colleagues to carry out the lesson.* (maximum 400 words).

As a science teacher, although I am familiar with the concept of bioeconomy, I discovered how I can use bioeconomy in my class thanks to the training called "Boosting Bioeconomy Knowledge in Schools" organized by European Schoolnet and Bloom in 2019. After this training, I started thinking even more about bioeconomy and researching what I could do. As a result, I encountered the School Box and examined all the learning scenarios. I decided to implement the scenario "Don't waste your waste! - Raising Bioeconomy awareness", which I think is appropriate for my students' ages, levels, and online activities of learning scenarios. I examined all the stages in the learning scenario (video, game, experiment ...). I chose activities that are appropriate to the level of my class. Since there is no Turkish source of bioeconomy, I have prepared a video about bioeconomy. I applied the bio-based disinfectant production in the scenario exactly and asked my students to make a short commercial about the products they prepared. Unfortunately, I could not establish the career links of bioeconomy, a part of the scenario. However, I emphasized that professions in the field of bioeconomy will be important in the future. In addition to the scenario, I prepared a matching game, puzzle activity, and worksheet to follow the process using the Bookwidgets application. I prepared a 10-question assessment exam using the Quiziz application. Finally, I asked them to create a bio-based product from the waste in their family home. (See all in the Annex)

Learning outcomes

What did you achieve? Please describe the main learning outcomes you achieved with the (online) implementation of the selected School Box resource. Tell us about anything that supports your case for achieving these learning outcomes. For example, student comments, or any other evidence that illustrates the benefits and impact of your use of the School Box resource.
Note that you MUST have permission to include any photographs or screenshots especially parental permission in the case of young people. Any pictures you include should be added directly in the entry form.

With the learning scenario named "Don't waste your waste! - Raising bioeconomy awareness", I achieved meaningful and beautiful learning outcomes. Rising awareness and feedback from parents and students about the concept of bioeconomy were great. Stating that the event is both meaningful and enjoyable, they pointed out that they take a different look at the waste that occurs in their homes and their surroundings. The most important learning outcomes are the reusable biological-based products that my students produce from domestic wastes with their families, fun brochures to promote these products and commercials they shoot. Besides, even a small

competition environment was created by playing the game named "Biowhat" based on time and knowledge. The educational games I prepared enabled my students to have fun, reinforce the concepts and the subject. Thanks to the worksheet I prepared to follow my students' progress in the process, I had the chance to observe what they were doing at what stage. In the last part of the event, I made a formative evaluation of the concept of bioeconomy with the online quiz I applied. See the activity video (parents/guardians of students authorised dissemination of their images).

Teaching outcomes

What did you, as a teacher (or a group of teachers) get out of teaching with the BLOOM School Box? What would you say to other people thinking about using bioeconomy in their teaching? *If you are entering the competition in categories 3 or 4 (collaborative teaching), please also describe your experience in collaborating with teachers of other subjects in your classroom. What is different from traditional teaching?* (maximum 200 words).

As a teacher, I believe that the knowledge I acquired from "Boosting Bioeconomy Knowledge in Schools" has broadened my horizons in the field of bioeconomy. In addition to the "Turn Milk into Plastic" learning scenario I prepared for this training, I think the quality learning scenarios prepared and implemented by my colleagues in the BLOOM School Box are very beneficial for my professional and personal development. I think that by applying these learning scenarios I can inspire my students for a beautiful, sustainable world. The important feedback I have received from my students and their parents encourages me to build future activities and motivates me to produce new projects.

Based on this activity, I plan to make bioeconomy more comprehensive in cooperation with different fields. I believe that the teachers whom the students see as role models should take an active role in the field of bioeconomy for nature and our future. Bloom School Box is certainly a good start. They should choose a scenario that suits their class level and try the concept of bioeconomy in their classrooms. At this stage, I would like to share the learning scenarios I have applied in the field of bioeconomy, the materials I have prepared with my colleagues and convey this positive effect to my students and my educational path. The awareness of more teachers and students about the concept of bioeconomy will enable us to look to the future with hope.

About the BLOOM project

BLOOM is an EU Coordination and Support Action implemented from 2017 to 2020. The project aims at bringing together partners from across Europe to debate, communicate, and engage the public in the potential of bioeconomy. An economy based on biomass promises to foster a circular economy and to enhance climate change mitigation, while reducing dependence on fossil fuels. Bioeconomy covers a broad range of sectors, from agriculture and the agrifood industry, to fisheries, forestry, biorefineries, chemistry and (bio) energy – but despite its many applications, it has yet to enter into the public consciousness as an exciting solution to societal challenges.

Annex

MY ADAPTED LEARNING SCENARIO

Title: Bioeconomy for our sustainable future
Authors: Semih ESENDEMİR
Subject: Science
Summary: Students will explore the basics of bioeconomy by producing videos, discussions, online materials, games, and new products available from organic waste. They will produce and test bio-based products. By creating a leaflet, poster, and advertisement about their products, they will create awareness in the dissemination of bio-based products in society.

Online materials:
- Video called [bioeconomy for a sustainable future](#) – In Turkish language

- A game called [Biowhat](#)

- [Matching activity](#) – In Turkish language

- [Puzzle activity](#)

- Assessment activity [Quiz](#) – In Turkish language

- [Worksheet](#) to follow the process – In Turkish language

Offline materials:
Orange, mandarin or lemon peels, White vinegar, Jar or bottle, Sieve or filter paper…

Resources used:
- Don't waste your waste! - Raising Bioeconomy awareness [Learning Scenario](#)

- [Bioways](#)

Aim of the lesson: At the end of this activity, students are expected to learn the concept of bioeconomy and increase their awareness of bioeconomy.

Lesson Plan:
1. Students accumulate citrus fruits (oranges, mandarins, lemons ...) they consume in their homes instead of throwing them away. Instead of throwing these fruit peels in the trash, they will think about how they can use these fruit peels in different ways. It enables students to generate alternative ideas.
2. They watch the video titled ["Bioeconomy for a sustainable future".](#) – In Turkish
3. After watching the video, students research the concepts of fossil fuel, renewable energy sources, biological waste (organic waste), and bioeconomy. During the research, students answer the following questions?
   - What is a fossil fuel and where do we use fossil fuels?
   - Why won't we be able to use fossil fuels for a long time?
   - From which alternative energy sources can we obtain the energy instead of fossil fuels?
   - What is bioeconomy? What are the positive changes that can be achieved in our lives by using bioeconomy?
   - What are the biological resources and product samples created from this source?

4. At the end of the research, students play "Bio… what" game.
5. To prevent the Co-vid 19 virus outbreak; students make bio-based disinfectants using citrus peels and white vinegar, which are accumulated following the instructions below.
   - Put the collected peels of fruit into a glass container (bottle, jar…).
   - Add enough white vinegar to the top of the fruit peels.
   - Seal the container hermetically and keep it away from the sun at room temperature for two weeks.
   - After two weeks, drain the fruit peels and use them wherever you want.
6. At the end of two weeks, students check the colour and smell of the bio-based disinfectant made. Then they test the resulting product in any stained area or even compare it to another surface cleaner.
7. Students give their bio-based disinfectant a name and prepare brochures, banners, posters, or shoot a video to ensure that their product is marketed.
8. Students create a new product using any organic waste,

Assesment:

1. Students play a matching game on Bookwidgets application that enables the matching of biological resources and products consisting of these resources.
2. Students make a puzzle explaining the importance of bioeconomy on Bookwidgets application. At the end of this puzzle, students tell what the picture means.
3. Students do a 10-question test on the Quiziz application for activity evaluation.
4. Worksheet prepared on Bookwigdets application is used to follow the progress of the students in the process.

Activity video : https://youtu.be/krBTEIcdxzA