

BLOOM Stories

Title of your Story of Adaptation

Bioeconomics and Fruit

Name of the author(s)

Natalia Grushko

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)	
2. Teaching with bioeconomy in secondary schools’ STEM classes (individual work)	X
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 adapted. **X**

Bloom your school with your biofuel and soap lab	X
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	



Please indicate with an "X" which BLOOM School Box resource you adapted.	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	X
Back to the Future	

Abstract

Please briefly summarise your adaptation (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 adaptation.

The future is in our hands. The current situation in the world related environmental degradation and weak societies' immune system assures us that it is true. One of the most practical and effective solutions is Bioeconomics. This high-tech sphere of economic activity enables the efficient use of biomass-based waste. Therefore, the sooner we realize it, the brighter our future will be. Students sitting at desks today will be those who will implement those actions to make life on the Earth possible for future generations.

During the BLOOM courses I attended in 2019, I learned how to prepare students for future realities. Therefore, I decided to organize an event that is based on 'Biofuel production from fruit waste'. Students learned about Bioeconomics, basic concepts of biofuels, fertilizers, and fruit wastes. They watched videos, passed quizzes, produced digital resources. Besides, they made a virtual excursion to a plant to see the production of pastilles: a natural fruit product made of berry puree. They also saw the creation process of secondary raw materials based on fruit waste.

In online and offline classes, digital audiences, collaboration, visual, and diverse learning methods were used. The components that make up the activity will help students understand the development directions of the future world economy and contribute to their development of a healthy diet, which can help them to boost the immune system and strengthen their bodies.

Keywords: Biomass, Biofuel, Pastilles, Health, Fruits.

The adaptation context

Please briefly describe the context of your adaptation, specifying: what subject(s) you chose to adapt 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 adaptation, so the context must appropriately reflect this.

This activity was designed for 31 students aged 12-13 years.

Subjects: Science, Biology, Chemistry, Physics, Mathematics, Computer Science.

Students do not have any previous knowledge of Bioeconomics.

Content knowledge: critical thinking, scientific inquiry, laboratory skills, data collection, creativity, reflection, collaboration.

Collaborative learning: a strong focus on group work.

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Lifelong Learning: The learning process does not stop during the quarantine.

Cloud-based learning: data, tools, and software are all available on the Internet that can be accessed and used on different devices such as computers, tablets, and smartphones.

Learning: Students learn while having fun.

Visual Search and Learning: Images and multimedia are more powerful than words.

Assessment: The focus of assessments shifts from "what you know" to "what you can do".

Mutual learning: Students learn from peers and give feedback to each other.

Note: the laboratory experiments that students will look at will not involve deep immersion in Chemistry, but rather build the understanding of the processes that take place. Students will become acquainted with the [LiCo.Organic](#) mobile application, which allows us to reproduce the spatial structure of organic matter molecules in a three-dimensional image in augmented reality.

Your story

What would you do? Please describe how you would use the BLOOM School Box in your online classroom/teaching. For example, what would be the structure of the session(s); how would you adapt the resource?

If you are entering the competition in categories 3 or 4 (collaborative teaching), describe how you would work together with your colleagues to carry out the online lesson. (maximum 400 words).

Follow a detailed description of the stages of students' work of the educational event.

Online Lesson 1

1st Step: The first online meeting started with students watch a [video](#) (content in Ukrainian) created by their classmates about the protection of the environment. Then they are briefly familiarized with concepts of bioeconomy, climate change, environmental degradation, and the occurrence of unknown diseases. Resources:

- [Don't Burn Leaves \(Shorter Version\)](#)
- [Why burning leaves is a bad idea](#)
- [Bloom Bioeconomy Infographic](#)

2nd Explain the following task: to create e-books on humanity issues with [StoryJumper](#). See examples of students' work:

- [Climate change and Environmental Challenges](#)
- [Ecological Problems](#)
- [Nature Climate in Ukraine](#)

Online Lesson 2

1st step: students will browse through videos, resources, materials. With that they will gain better insight into the topic of Bioeconomy and discuss the role of plants in our ecosystem. Highlighting the great engines of energy creation that plants are for us.

2nd step: defining what biomass and biofuels are. We discuss the importance of Bioeconomics and circular economics.

Resources for this lesson:

- [The Bioeconomy starts here!](#) – Video, EU Science & Innovation

- [Prezi presentation](#) on Bioeconomy
- [The bioeconomy in our everyday lives](#) - BIOWAYS video
- [Biocluster.dk](#): Business in the Bio-Based Economy – Video
- [MOOC Think Biobased](#) - Agriculture in the biobased economy - Video

3rd step: Homework. Students to create PowerPoint presentations (see [here](#) examples of students' work) about Bioeconomics and check their knowledge via [this Quiz](#).

Online Lesson 3

1st step: A virtual excursion to a private entrepreneur pastila.mamina ([Instagram account](#) in Ukrainian). Students follow the whole process of making pastilles - sweets made from mashed fruits or berries. Useful properties: pastilles retain all the nutrients and beneficial properties of fruits or berries; it is a raw diet and low-calorie product. Also, students can see how fruit crisps are made.

2nd step: at the end of the lesson, students are asked another question: what about production waste like pits and peels? What can be done with them? No immediate response is required, they should think about it.

3rd step: homework. The students are divided into three groups: [biofuels](#), [biofertilizers](#), and [bio-goods](#). Each group must work on (read, reflect, research further) their respective materials. Then share the thoughts in Padlet and give some examples.

Additional resource: [Bio Learn - Applications Factsheets](#)

Online Lesson 4

It will be based on discussions. Students will watch experiment videos. Then they will work with the app of augmented reality.

Creation of biofuels:

- [Science in 1 minute: how is biodiesel made?](#) Video
- [Fermentation and the preparation of ethanol](#) | Production of Materials | Chemistry Video
- [A Simple Distillation Explained](#) Video

Creation of biofertilizers: [How to Compost](#)

Creation of bio-goods: [The beauty of apple eco-leather – stunning eco-friendly vegan leather](#)

Peer-to-peer feedback for each group of presenters (each group will provide their feedback and assessment to the other groups).

Once students have learnt the vocabulary of the unit and the process and importance of biomass, the teachers will help them revise their knowledge with the following Kahoot quizzes:

Quiz 1 <https://goo.gl/JgtS48>

Quiz 2 <https://goo.gl/Wvuxc8>

Finally, after the social isolation period is over, I suggest scheduling an exhibit to show what the students have learned about the bioeconomy. Students can prepare posters, models, presentations to showcase their newly acquired knowledge.

Learning outcomes

What would you like to achieve? Please describe the main learning outcomes you would like to achieve with the adaptation of the selected School Box resource. Tell us about anything that supports your case for achieving these learning outcomes. For example, student comments from previous activities, or any other evidence that illustrates that using and adapting one of the School Box resources would be beneficial and impactful for your students.

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.

The result of our activity is to work together as a team, to become more environmentally sustainable and to develop an understanding of the bioeconomy, incorporating its concept into our daily lives. I will promote active citizenship among students by establishing them as eco-ambassadors at school.

Economics based on Biology, including the processing of living masses, will support sustainable development and it can contribute to the national economy. Our event's focus is on sustainable management of natural resources and waste management which will reduce the negative impact on climate change. This activity allows students to learn how a circular economics model works. Introducing them to this new perspective of sustainability – which is built on the natural world, where everything is seen as a resource to the next level of the food chain, leading to zero waste. Consequently, generating fundamental knowledge about the natural processes for obtaining resources instead of waste.

Students will be able to identify organic-based products, to use specific words and terminology of the bioeconomy sphere. They will also discover new processes that involve the production of biofuels and recyclables. Finally, students will learn how to recognize equipment, laboratory supplies, learn how to measure, record, and produce data using calculations and graphs.

Teaching outcomes

What would you, as a teacher (or a group of teachers) get out of teaching online 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).

Bioeconomics is a bridge between technology, ecology, society, and economics as well as their interaction. The activities we take for students, introducing them to the Bioeconomy, are preparing future citizens who can understand and make a positive change in the world. Also, Bioeconomics requires the participation of various scientific disciplines and their successful cooperation. These disciplines come from the social and economic sciences, engineering, and natural sciences, which will give students a motivation to study.

Knowledge about bioeconomics is a major requirement for 21st-century students. Not only will the bioeconomy sector provide jobs in the future, but this knowledge will also help our students better understand the challenges of tomorrow's society and improve their skills as responsible citizens.

The activity has sensitized my thoughts and outlook to a new world full of potentially called bioeconomics. My role as a teacher lies not only in the development of teaching materials suitable for teaching bioeconomics, but also in the creation of educational spaces that will foster the multidisciplinary approach required in this field.

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 agri-food industry to fisheries, forestry, biorefineries, chemistry, and bioenergy – but despite its many applications, it has yet to enter into the public consciousness as an exciting solution to societal challenges.