



Deliverable 3.1: Developed BioBeo Education Programme

BioBeo

Innovative Education for the BioEconomy



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the European Union



MAYNOOTH UNIVERSITY
NATIONAL CHAMPION
IN LEADERSHIP



E-STEM



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Abbreviations

E3STEM	Hellenic Education Society of STEM
MU	Maynooth University
OUAS	ODISEE University of Applied Sciences
RUAS	Rotterdam University of Applied Sciences
SDG	Sustainable Development Goal
STEM	Science, Technology, Engineering and Mathematics
UCD	University College Dublin

Executive Summary

Welcome to the BioBeo Education Programme:

The BioBeo Education Programme responds to the urgent need for public understanding of the bioeconomy as a foundation for sustainable development. This report presents a comprehensive suite of educational resources co-created by leading academic, scientific, and educational partners across Europe. These resources are designed to build awareness, knowledge, and agency among learners at all levels.

The materials cover formal and informal education, from early years to secondary school, as well as teacher training and community engagement. Each resource aligns with the five central themes of the BioBeo project: Interconnectedness, Outdoor Learning, Food Loop, Forestry, and Life Below Water. The resources also map directly to the United Nations Sustainable Development Goals, enabling policy alignment and measurable impact.

Each entry in this document is clearly structured, listing the organisation, country, age group, curriculum links, teaching methodologies, and relevant SDGs. Lessons span subjects such as biology, environmental science, engineering, computing, and the arts, with strong emphasis on cross-disciplinary and inquiry-based learning.

This Education Programme offers more than lesson plans. It presents a strategic framework for embedding bioeconomy concepts across European education systems. It enables learners to connect global sustainability goals with local action. It fosters ecological literacy, systems thinking, and future readiness. The Programme contributes directly to the European Green Deal and the EU Bioeconomy Strategy by equipping citizens with the understanding and skills to lead the transition towards a circular, nature-based economy.

The BioBeo Education Programme is available at <https://www.biobeo.eu/education-programme/>

BioBeo Bioeconomy Definition:

“Bioeconomy is a systems-based approach that seeks to replace fossil resources in a sustainable manner with renewable biological resources from terrestrial and marine ecosystems – such as forests, crops, animals, fish, microorganisms, organic waste, and agricultural side streams, to produce food, feed, fibres, energy, bio-based products, and services within a circular economy framework designed to optimise resource use based on a cascading hierarchy of utilisation options. A sustainable and circular bioeconomy requires the application of education and training programmes, scientific research, technology, and innovation with the aim of not only creating economic value, but also regenerating and expanding ecosystems and biodiversity as well as improving the health and the well-being of society. By addressing these systemic changes in the economy, environment, and society, the bioeconomy contributes to achieving a better and more sustainable future where no one is left behind.”

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Introduction

Welcome to the BioBeo Education Programme:

The transition to a sustainable and circular bioeconomy requires a profound shift in how we learn, teach, and act. Education plays a central role in enabling this change. The BioBeo project addresses this challenge by placing bioeconomy education at the heart of learner experience, civic engagement, and curriculum innovation.

This report showcases the full set of educational materials developed under the BioBeo project. These resources have been piloted and refined across multiple countries and education systems. They reflect a shared European vision: to empower the next generation with the knowledge, values, and skills required for a just and regenerative future.

The resources span multiple levels and contexts: early childhood education, primary and secondary schools, STEM and STEAM learning, environmental education, teacher training, parental involvement, and community participation. Every resource contributes to an integrated pedagogical model grounded in sustainability science, systems thinking, and active citizenship.

The materials are thematically aligned with BioBeo's core educational pillars: Interconnectedness, Outdoor Learning, Food Loop, Forestry, and Life Below Water. They also map directly to key Sustainable Development Goals, particularly those relating to education, climate action, sustainable consumption, biodiversity, and innovation.

This Programme reflects a new standard for bioeconomy education in Europe. It demonstrates how educational innovation, cultural relevance, and scientific excellence can converge to deliver systemic impact. The resources included here are not only tools for classrooms, they are catalysts for transformation across communities, schools, and institutions.

- A. How to: Bioeconomy Education
- B. Preschool and Primary School Materials
- C. Secondary School Materials
- D. Idea Gathering and Youth Engagement Resources
- E. Further Materials

In addition to being bundled together as a project deliverable, the BioBeo Education Programme is also available at <https://www.biobeo.eu/education-programme>.

A. How to: Bioeconomy Education

The Missing Link - A Practical Guide for Teachers on how to Teach Bioeconomy

Organisation: Foundation for Environmental Education (FEE) & Parents International (IPA)

Topic: Teacher empowerment for Bioeconomy Education, including child and parental engagement

Introduction:

The Missing Link is a practical guide for teachers on how to teach bioeconomy

Narrative:

This guide serves as a missing link between the theory of bioeconomy education and the lesson plans created within the framework of the project. It focuses on the methodology of how interested teachers can set out and engage all school stakeholders (students, parents, colleagues, non-teaching staff, etc.) in teaching about the bioeconomy. It gives practical advice and provides hands-on tools that support the teachers in their everyday work (not just when teaching bioeconomy). It also includes several tools for self-reflection, self-evaluation and dissemination to enable sustainability.

SDGs:

4 – Quality Education

12 – Responsible Consumption and Production

13 – Climate Action

Age Group:

All (applies to primary and secondary education)

Curriculum Integration:

SPHE, Citizenship Education, Home-School Liaison, Environmental Studies

Themes Addressed:

Interconnectedness ☒

Outdoor Learning ☒

Food Loop ☒

Forestry ☒

Life Below Water ☒

What is the Bioeconomy? Integrating Bioeconomic Topics Across Different Subjects

Organisation: University of Hohenheim (UH)

Topic: Teacher introduction to Bioeconomy Education and Integrating Bioeconomic Topics Across Different Subjects

Introduction:

Presentation and Short Video (7 mins) What is the Bioeconomy? Integrating Bioeconomic Topics Across Different Subjects

Narrative:

This presentation by Dr. Evelyn Reinmuth (UH) aims to prepare teachers to educate their pupils about the bioeconomy. It emphasizes that the bioeconomy is a promising solution to global challenges like climate change, fossil resource dependence, and biodiversity loss. Defined as a systems-based approach, the bioeconomy sustainably replaces fossil resources with renewable biological resources, guided by principles such as sustainability, circularity, and inter- and transdisciplinarity. Recognizing that a stand-alone bioeconomy subject often doesn't exist, the presentation offers concrete examples for integrating bioeconomy topics across various subjects like Biology, Chemistry, and Economics. It also discusses barriers to implementation, such as legal and organizational constraints, and introduces subject-independent teaching materials like board games and animated videos to assist educators. The overarching goal is for the bioeconomy to facilitate systemic changes for a better, more sustainable future that creates economic value, contributes to ecosystem regeneration, and improves societal well-being.

A short video is also available <https://www.youtube.com/watch?v=oYSOcp5hiO8>

SDGs:

- 4 – Quality Education
- 12 – Responsible Consumption and Production
- 13 – Climate Action

Age Group:

All (applies to primary and secondary education)

Curriculum Integration:

SPHE, Citizenship Education, Home-School Liaison, Environmental Studies

Themes Addressed:

- Interconnectedness ☒
- Outdoor Learning ☒
- Food Loop ☒
- Forestry ☒
- Life Below Water ☒

SEE ALSO BioBeo Deliverable 2.1: Train the Trainer Manual - Engaging stakeholders, especially parents and students at various governance levels

Organisation: Parents International (IPA)

Topic: Stakeholder Engagement & Capacity Building

Introduction:

This training manual equips facilitators, educators, and policy influencers with the skills and content to foster active citizenship and systemic changes for a more sustainable future.

Narrative:

The manual specifically focuses on the theory and practice of community and parental engagement, as well as child participation, rather than pedagogical content on the bioeconomy itself. It provides self-directed learning elements, detailed training activities across modules such as communication in diverse groups, whole school approaches, universal design, shared leadership, and advocacy. This resource supports peer-training and offers practical advice for organizing and implementing sessions for audiences including school leaders, teachers, parents, and student leaders. Ultimately, it seeks to foster active citizenship and systemic changes for a more sustainable future by integrating diverse voices in education policy and school life.

SDGs:

- 4 – Quality Education
- 12 – Responsible Consumption and Production
- 13 – Climate Action
- 17 – Partnerships for the Goals

Age Group:

Adult learners, educators, community stakeholders, policymakers

Curriculum Integration:

Initial Teacher Education, Adult Education, CPD (Continuous Professional Development), NGO capacity-building, Policy consultation

Themes Addressed:

- Interconnectedness ☒
- Outdoor Learning ☒
- Food Loop ☒
- Forestry ☒
- Life Below Water ☒

B. Preschool and Primary School Materials

English Language and Irish Language Education Programme for Primary Schools

Organisation: Maynooth University

Topic: Bilingual Bioeconomy Education for Primary Schools

Introduction:

This bilingual (English and Irish) resource pack empowers children aged 5–12 to explore the bioeconomy through nature-based, experiential learning. Rooted in Irish culture, language, and landscape, the programme promotes environmental stewardship, creative expression, and systems thinking across curricular areas.

Narrative:

The programme offers fully developed lesson plans in both English and Irish, designed to be flexible, inclusive, and place-responsive. Activities include forest exploration, pond building, artistic responses, and storytelling. Lessons nurture a strong connection with nature while supporting bioeconomy literacy through culturally relevant pedagogy and holistic development. The resource aligns with the Irish primary curriculum and supports teachers in delivering education for sustainability in both official languages.

SDGs:

- 4 – Quality Education
- 12 – Responsible Consumption and Production
- 13 – Climate Action
- 14 – Life Below Water
- 15 – Life on Land

Age Group:

5–12 years

Curriculum Integration:

English, Irish, SESE (Environmental Studies), SPHE (Wellbeing), Visual Arts, Drama, Music

Themes Addressed:

- Interconnectedness ☒
- Outdoor Learning ☒
- Food Loop ☒
- Forestry ☒
- Life Below Water ☒

Lesson Titles – English:

1. Introduction to the Circular Bioeconomy
2. An Coillín Beag

3. Life Below Water: Let's Go Build a Pond!
4. Food Loop – Helping the Little Wood Grow
5. An Artistic Adventure with BioBeo
6. Telling the Story of our Bioeconomy Learning Journey: An Artistic Response

Teidil na bPleananna – Gaeilge:

1. Réamhrá don Bhithgheilleagar Ciorclach
2. An Coillín Beag
3. Saol Faoi Uisce: Cruthaigh Lochán!
4. Lúb Bia – Ag Cabhrú leis an gCoillín Beag le Fás
5. Eachtra Ealaíne le BioBeo
6. Ár dTuras Foghlama BioBeo: Freagra Ealaíonta na bPáistí

Nurturing Sustainability with Bioeconomy – Primary Lesson Resource

Organisation: Maynooth University and adapted by the Foundation of Environmental Education

Topic: Primary-level Bioeconomy Education

Introduction:

This set of interdisciplinary lessons introduces children aged 5–12 to the bioeconomy through hands-on outdoor learning. Rooted in Froebelian ecofeminism and systems thinking, the lessons foster emotional connection, critical thinking, and sustainable values.

Narrative:

The BioBeo Primary Resources focus on experiential, outdoor, and inquiry-based learning. Children explore key themes such as biodiversity, sustainable food systems, and marine environments. Lessons integrate the arts, environmental science, and citizenship education to build knowledge and empathy. Learners are viewed as co-researchers and encouraged to engage with their school and local communities.

SDGs:

- 4 – Quality Education
- 12 – Responsible Consumption and Production
- 13 – Climate Action
- 14 – Life Below Water
- 15 – Life on Land

Age Group:

5–12 years

Curriculum Integration:

Environmental Sciences, Literacy, Mathematics, SPHE (Social, Personal and Health Education), Visual Arts, Music, Drama

Themes Addressed:

- Interconnectedness ☒
- Outdoor Learning ☒
- Food Loop ☒
- Forestry ☒
- Life Below Water ☒

Lesson Titles:

- Nature Detectives
- Tree of Life
- Our Living Landscape
- From Food to Fertiliser

- Sea of Change

Bees are the Tireless Workers of Nature

Organisation: E3STEM

Topic: Sustainable economy and products, beekeeping, ecosystems, bioeconomy

Introduction:

This engaging workshop introduces children aged 5–12 to the vital role of bees in biodiversity, food production, and circular bioeconomy practices. Combining inquiry-based learning and gamification, the activity explores bee behaviour, pollination, and sustainable resource use.

Narrative:

Bees play a crucial ecological role by supporting biodiversity through pollination and providing bio-based products like honey, wax, and propolis. These products contribute to local economies and align with circular bioeconomy principles. Students learn about the importance of bees, explore ecosystems, and create crafts using natural materials.

SDGs:

15 – Life on Land

Age Group:

5–12 years

Curriculum Integration:

Environmental Sciences, Science, Biology, Chemistry, Physics

Themes Addressed:

- Interconnectedness ☒
- Outdoor Learning ☒
- Food Loop ☐
- Forestry ☒
- Life Below Water ☐

Lesson Title:

1. Bees are the Tireless Workers of Nature

BioBeo Robot - Teaching Sustainability Through Educational Robotics

Organisation: E3STEM

Topic: Bioeconomy and Educational Robotics

Introduction:

The BioBeo Robot project enables learners aged 8–12 to explore the concept of bioeconomy through the design, construction, and programming of a custom robot. It combines sustainability education with active, hands-on learning in STEAM subjects.

Narrative:

Using the PAMK robot prototype, students explore interconnectedness and circularity. Lessons integrate microbit sensors and Scratch programming, encouraging learners to co-create interactive robots that measure light, temperature, and perform bioeconomy-themed tasks. The robot functions as both a teaching tool and collaborative project that fosters digital literacy and environmental awareness.

SDGs:

- 4 – Quality Education
- 9 – Industry, Innovation & Infrastructure
- 12 – Responsible Consumption and Production
- 13 – Climate Action

Age Group:

8–12 years

Curriculum Integration:

Environmental Sciences, Biology, Chemistry, Physics, Mathematics, Computer Science, Arts, Bioeconomy Education

Themes Addressed:

- Interconnectedness ☒
- Outdoor Learning ☒
- Food Loop ☒
- Forestry ☒
- Life Below Water ☒

Lesson Titles:

1. Introduction to the Bioeconomy
2. A Bioeconomy Robot
3. Designing a Bioeconomy Robot – Software/Automations
4. Designing a Bioeconomy Robot – Hardware
5. Building the Final Product
6. Evaluating the Robot & Sharing Ideas

C. Secondary School Materials

BioBeo Secondary Education Programme – Teacher’s Manual and Lesson Packages of powerpoint presentations and worksheets (English, Dutch, French)

Organisation: Odisee University of Applied Sciences (OUAS)

Topic: Bioeconomy, Circular & Sustainable Systems

Introduction:

This teacher’s manual offers a comprehensive six-lesson package designed for students aged 12–15. It introduces the sustainable circular bioeconomy, exploring how renewable biological resources can replace fossil fuels within a zero-waste framework.

Narrative:

The package emphasises replacing fossil-based economics with renewable, biology-based resources (e.g. forests, crops, organic by-products). Students learn how plant photosynthesis stores CO₂ efficiently and how forestry, food production, waste management, and blue economy interconnect. They explore real-world practices: composting, biogas production, sustainable wood use, marine resources, and the circular reuse of materials to combat greenhouse gases.

SDGs:

- 2 - Zero Hunger
- 3 - Good Health
- 12 - Responsible Consumption & Production
- 13 - Climate Action
- 14 - Life Below Water
- 15 - Life on Land

Age

12–15 years

Group:

Curriculum

Supports development of sustainable development competencies, integrating science, geography, economics, citizenship education, and critical thinking.

Integration:

Themes Addressed:

- Interconnectedness ☒
- Outdoor Learning ☒
- Food Loop ☒
- Forestry ☒
- Life Below Water ☒

Lesson Titles:

- 1. Sustainable Circular Bioeconomy**
- 2. Interconnectedness**
- 3. Outdoor Learning**
- 4. Food Loop**
- 5. Forestry: Forests & Their Products**
- 6. Life Below Water**

Each lesson package includes preparatory PowerPoints, student worksheets, outdoor tasks, reflection prompts, and evaluation guidance. The resources are adaptable and designed for both standalone use or integrated curriculum delivery.

Bioeconomy Workshop Plans

Organisation: RUAS (Rotterdam University of Applied Sciences)

Topic: Place-based, experiential workshops exploring the bioeconomy through nature, food, waste, ecosystems, and sustainable living

Introduction:

This series of seven workshops encourages learners to connect with nature, reflect on their personal impact, and explore sustainability through outdoor learning, gamification, and inquiry-based activities. Developed within the LEAF programme, each workshop is designed to make the bioeconomy tangible through sensory engagement, ecosystem understanding, and circularity thinking.

SDGs Addressed Across Workshops:

- 2 – Zero Hunger
- 3 – Good Health and Well-being
- 4 – Quality Education
- 12 – Responsible Consumption and Production
- 13 – Climate Action
- 14 – Life Below Water
- 15 – Life on Land

Age Group:

Mixed ages (Primary and Lower Secondary; adaptable for 8–15 years)

Curriculum Integration:

Environmental Sciences, Geography, Biology, Citizenship Education, Food Science, Arts

Themes Addressed (varies per activity):

- Interconnectedness ☒
- Outdoor Learning ☒
- Food Loop ☒
- Forestry ☒
- Life Below Water ☒

Workshop 1 – The Food Hike

Description:

Participants go on a hike and learn about the journey of food from farm to fork. Along the route, discussion prompts and role cards raise awareness of food production, waste, transportation, and sustainability. Learners reflect on their own diets and food choices.

Workshop 2 – The Forest Clean-Up

Description:

Learners become citizen scientists, identifying and collecting litter from forest environments. They analyse waste types and reflect on the consequences for ecosystems and biodiversity. The workshop links personal responsibility with environmental action.

Workshop 3 – Back to Nature

Description:

Participants immerse themselves in a natural environment, tuning into sounds, smells, and sights. Aimed at deepening emotional connection with nature, this mindfulness-based activity fosters respect for ecosystems and reinforces nature's intrinsic value.

Workshop 4 – Dealing with Food Waste

Description:

Students track their own food waste over several days, then compare and discuss data. They learn about composting, fermentation, and food-saving strategies. This workshop connects everyday behaviour to circular economy solutions.

Workshop 5 – Healthy Food and Your Impact

Description:

Using a "food wheel" and product cards, participants explore the impact of various foods on their health and the environment. They learn how diet affects biodiversity, carbon footprint, and sustainability, encouraging more conscious eating habits.

Workshop 6 – Trash Treasures

Description:

Learners upcycle waste into creative works of art. This hands-on activity builds awareness of the value in waste and highlights resource use, design thinking, and sustainable creativity. It promotes the idea that "waste" can be transformed into something meaningful.

Workshop 7 – Quartet Game: Overfishing

Description:

Through a card-based game, students learn about marine species, their conservation status, and the effects of overfishing. The workshop introduces sustainable fishing concepts and encourages responsible seafood consumption, aligned with SDG 14.

Exploring the Ocean Currents in Circular Bioeconomy

Organisation: E3STEM

Topic: Ocean currents and climate systems in the context of the circular bioeconomy

Introduction:

This three-lesson resource introduces secondary students to the scientific principles behind ocean circulation and its importance in regulating global climate and supporting biodiversity. Students engage in inquiry-based activities that simulate real-world environmental dynamics.

Narrative:

Through hands-on experiments and active learning, students investigate how factors like salinity and temperature influence ocean current behaviour. The resource encourages learners to explore links between human activity, climate change, and the health of marine ecosystems, promoting systems thinking and climate action through the lens of the circular bioeconomy.

SDGs:

12 – Responsible Consumption and Production

13 – Climate Action

Age Group:

12–18 years

Curriculum Integration:

Environmental Sciences, Geography, Biology, Chemistry, Physics

Themes Addressed:

Interconnectedness ☒

Outdoor Learning ☐

Food Loop ☐

Forestry ☐

Life Below Water ☒

Lesson Titles:

1. Effects of Salinity and Temperature on Density and Stratification
2. Effect of Stratification on Mixing
3. Convection Under Ice

From Satellite to Soil - Sustainable Agriculture

Organisation: E3STEM

Topic: Soil management, sustainable agriculture, and circular bioeconomy

Introduction:

This three-lesson sequence explores the critical role of soil as a living ecosystem and its place in sustainable agricultural practices. The lessons invite students to experiment with soil health indicators and natural fertilisation methods.

Narrative:

Students learn about composting, crop rotation, and the impact of chemical fertilisers. By engaging in active learning and guided discovery, they analyse how human agricultural practices affect biodiversity and climate. The resource reinforces the need to shift towards regenerative, bio-based approaches in food production, with a focus on closing nutrient loops.

SDGs:

12 – Responsible Consumption and Production

13 – Climate Action

15 – Life on Land

Age Group:

12–18 years

Curriculum Integration:

Environmental Sciences, Chemistry, Biology, Geography, Agriculture

Themes Addressed:

Interconnectedness ☒

Outdoor Learning ☒

Food Loop ☒

Forestry ☐

Life Below Water ☐

Lesson Titles:

1. Composting – The Soil's Food Loop
2. How Does Fertiliser Affect Soil?
3. Agriculture and Soil as a Living Organism

BlueCity

Organisation: RUAS (Rotterdam University of Applied Sciences)

Topic: Urban circular bioeconomy in practice through case-based learning

Introduction:

Using the example of BlueCity, a circular economy hub in Rotterdam, this interdisciplinary resource challenges students to think critically about sustainability solutions in urban environments.

Narrative:

Students explore how waste streams become resources and how local actors develop sustainable businesses using bio-based models. Through site analysis, reflection, and systems thinking, learners connect local innovations to global sustainability challenges. This resource highlights real-world entrepreneurship in circular bioeconomy and empowers students to imagine regenerative futures.

SDGs:

- 9 – Industry, Innovation & Infrastructure
- 11 – Sustainable Cities and Communities
- 12 – Responsible Consumption and Production

Age Group:

15–18 years

Curriculum Integration:

Environmental Studies, Business Studies, Geography, Sustainability Science

Themes Addressed:

- Interconnectedness ☒
- Outdoor Learning ☒
- Food Loop ☒
- Forestry ☐
- Life Below Water ☒

Lesson Titles:

1. Circularity in BlueCity
2. Exploring Waste as Resource
3. Rethinking Urban Systems for Sustainability

D. Idea Gathering and Youth Engagement Resources

BioBeo Guidelines for Generating Ideas

Organisation: BioBeo Consortium

Topic: Creativity and ideation techniques for youth bioeconomy projects

Introduction:

This presentation provides guidelines to support young people in generating creative ideas for bioeconomy-related projects. It is designed to help students engage critically and innovatively with the five BioBeo themes through structured brainstorming, visualisation, and participatory thinking.

Narrative:

The guidelines introduce practical strategies for idea development, including role-playing, metaphorical thinking, provocations, and empathy-based exercises. These tools help students explore circularity, sustainability, and system-based thinking, offering inspiration for classroom projects, Youth Parliament contributions, or school-wide sustainability actions.

SDGs:

4 – Quality Education
12 – Responsible Consumption and Production
13 – Climate Action

Age Group:

12–18 years

Curriculum Integration:

Civic Education, Environmental Studies, Language Arts, Visual Arts, Bioeconomy Education

Themes Addressed:

Interconnectedness ☒
Outdoor Learning ☐
Food Loop ☒
Forestry ☒
Life Below Water ☒

BioBeo Creativity Techniques – Long Format Guide

Organisation: BioBeo Consortium

Topic: Creativity tools to foster innovative thinking in bioeconomy education

Introduction:

This extended resource presents over 25 creativity methods to inspire youth engagement in bioeconomy education. The techniques are suitable for educators, facilitators, and student leaders designing bioeconomy initiatives or campaigns.

Narrative:

Covering a wide range of creativity tools such as SCAMPER, storyboarding, mind mapping, and forced connections, the guide empowers learners to work collaboratively, ideate inclusively, and approach the bioeconomy from fresh, diverse perspectives. The methods also support project planning for the BioBeo Youth Parliament.

SDGs:

4 – Quality Education

9 – Industry, Innovation and Infrastructure

12 – Responsible Consumption and Production

Age Group:

12–18 years

Curriculum Integration:

Civic Engagement, Art and Design, Environmental Education, Technology, Bioeconomy

Themes Addressed:

Interconnectedness ☒

Outdoor Learning ☐

Food Loop ☒

Forestry ☐

Life Below Water ☒

How to: Contacting Youth Parliament

Organisation: BioBeo Consortium

Topic: Youth participation and democratic engagement in bioeconomy education

Introduction:

This document offers practical advice for contacting and engaging youth parliaments in discussions around the circular bioeconomy. It includes email templates and participation strategies for students and educators.

Narrative:

The guide is designed to empower students to become bioeconomy ambassadors by actively participating in democratic structures such as school councils and national youth parliaments. It encourages outreach to policymakers and helps align youth voices with environmental and sustainability agendas.

SDGs:

4 – Quality Education

16 – Peace, Justice and Strong Institutions

17 – Partnerships for the Goals

Age Group:

12–18 years

Curriculum Integration:

Civic Education, Global Citizenship, Environmental Studies, Political Science

Themes Addressed:

Interconnectedness ☒

Outdoor Learning ☐

Food Loop ☒

Forestry ☐

Life Below Water ☒

BioBeo Experiments to Try – Classroom Science Activities

Organisation: BioBeo Consortium

Topic: Hands-on science and sustainability experiments for classrooms

Introduction:

This presentation provides simple, accessible experiments that help learners connect bioeconomy themes to scientific investigation. Activities explore topics like water filtration, food preservation, and composting.

Narrative:

Each experiment encourages inquiry, collaboration, and critical thinking while supporting the exploration of natural cycles and sustainable practices. These low-resource activities are ideal for classroom use, science fairs, or environmental campaigns, and align with curriculum goals around systems thinking and responsible consumption.

SDGs:

12 – Responsible Consumption and Production

13 – Climate Action

15 – Life on Land

Age Group:

8–14 years

Curriculum Integration:

Science, Environmental Education, Chemistry, Geography, Bioeconomy Education

Themes Addressed:

Interconnectedness ☒

Outdoor Learning ☒

Food Loop ☒

Forestry ☒

Life Below Water ☒

E. Further Materials

Manual: Mushroom Cultivation and the Circular Bioeconomy

Organisation: BioBeo Consortium

Topic: Sustainable food systems and circular bioeconomy through mushroom cultivation

Introduction:

This manual offers a complete guide to mushroom growing as a hands-on way for students to engage with bioeconomy principles. It introduces learners to fungi as a renewable resource for food, medicine, packaging, and soil health.

Narrative:

The resource includes background science on fungi, simple cultivation methods using waste materials, and educational activities focused on sustainability and innovation. By growing mushrooms, students learn about the circular use of biomass, biodiversity, and ecosystem services, supporting local and low-impact food systems.

SDGs:

2 – Zero Hunger
4 – Quality Education
12 – Responsible Consumption and Production
15 – Life on Land

Age Group:

8–18 years

Curriculum Integration:

Biology, Environmental Sciences, Food Science, Chemistry, Bioeconomy

Themes Addressed:

Interconnectedness ☒
Outdoor Learning ☒
Food Loop ☒
Forestry ☐
Life Below Water ☐

BioBeo Career Profiles – Futures in the Circular Bioeconomy

Organisation: BioBeo Consortium

Topic: Career awareness and professional pathways in the bioeconomy

Introduction:

This booklet highlights real-life career stories from professionals working across bioeconomy sectors, as featured in the Biobuzz Newsletter. It is designed to inspire young learners to explore future opportunities in sustainable innovation, research, and entrepreneurship.

Narrative:

Through a series of interviews and short profiles, students encounter scientists, engineers, artists, business leaders, and educators whose work contributes to the bioeconomy. Each profile includes advice, education routes, and reflections on how circular thinking shapes their careers, supporting future-focused learning and skills development.

SDGs:

- 4 – Quality Education
- 8 – Decent Work and Economic Growth
- 9 – Industry, Innovation and Infrastructure

Age Group:

12–18 years

Curriculum Integration:

Guidance and Counselling, STEM, Business Studies, Environmental Science

Themes Addressed:

- Interconnectedness ☒
- Outdoor Learning ☐
- Food Loop ☒
- Forestry ☒
- Life Below Water ☒

FEE Academy – Online Sustainability and Bioeconomy Training

Organisation: Foundation for Environmental Education (FEE)

Topic: Professional development in environmental education and the bioeconomy

Introduction:

The FEE Academy is a global online learning platform that offers courses for educators, programme leaders, and youth on sustainability education. BioBeo content has been embedded into several modules to promote bioeconomy awareness. <https://www.feeacademy.global/>

Narrative:

Through the FEE Academy, users access certified courses in eco-literacy, climate education, outdoor learning, and now, bioeconomy. These e-learning materials support teachers in integrating circular and systems thinking across existing programmes like Eco-Schools, LEAF, and Global Action Days. Of particular interest:

GAIA 20:30 Circular Economy Course <https://www.feeacademy.global/enrol/index.php?id=28>

Circular Economy provides a regenerative framework to design a production and consumption system in which materials are used in cycles of closed loops. The course provides you with an overview of the concept of Circular Economy, its principles and introduces how the principles are being used to shift from a linear economy to a circular economy.

Time Required: 1-2 Hours

Target Group: Ages 16 and Above

SDGs:

- 4 – Quality Education
- 12 – Responsible Consumption and Production
- 13 – Climate Action

Age Group:

Educators and programme facilitators (adult learners)

Curriculum Integration:

Professional Development, Environmental Education, Global Citizenship

Themes Addressed:

- Interconnectedness ☒
- Outdoor Learning ☒
- Food Loop ☒
- Forestry ☒
- Life Below Water ☒

