

GENB TOOLKIT FOR TEACHERS

*pre - and early -
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GENB TOOLKIT FOR TEACHERS IN PRE- AND EARLY-SCHOOL

Bioeconomy resources for teachers to enhance their own training and to provide effective materials for teaching four- to eight-year-old students.

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Do you recognise the importance of teaching bioeconomy but need quality, easy-to-use training to get up to speed quickly? Looking for a simple way to introduce your students to bioeconomy concepts? Feeling overwhelmed by the abundance of online resources?

The **GenB Toolkit** and the **GenB Virtual Library** have made it easier by creating and gathering, respectively, the best tools and materials in one place. They help you learn about the bioeconomy and provide resources to explain these concepts clearly and effectively to four- to eight-year-old students. Ready to make your teaching more effective and impactful? Explore the GenB collection and make teaching the bioeconomy a breeze.

The **GenB Toolkit** is a rich collection of diverse resources, tools, and instructional materials designed to educate and raise awareness of the bioeconomy. Tailored to a wide audience—including pre- and early-stage students, primary and high school students, teachers, and multipliers—this toolkit is available in nine languages: Dutch, English, French, German, Greek, Italian, Portuguese, Slovak, and Spanish. Engage with materials that cater to various learning needs and levels, making bioeconomy education accessible and impactful.

The **GenB Virtual Library** is a user-friendly, extensive repository of high-quality resources and tools sourced from previous EU initiatives, European Commission projects, and other reputable platforms. Perfect for young people, educators, parents, policymakers, and the general public, this library offers over two-hundred materials in several of the twenty-four official EU languages. Navigate a wealth of valuable content to enrich your understanding and teaching of the bioeconomy.

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1 What is the bioeconomy and why should it be taught?

The bioeconomy refers to the production of renewable biological resources and their transformation into value-added products. These products include food, feed, bio-based materials, and bioenergy. By strengthening the bioeconomy, we move closer to a circular and low-carbon economy.

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Incorporating the bioeconomy into education fosters an understanding of sustainability, preparing students to lead in a world that demands green solutions and forms committed citizens who drive sustainable and resilient development.

2 Which GenB tools can reinforce my knowledge of the bioeconomy as a teacher?

Bioeconomy training for teachers

The following materials have been designed to equip teachers with a solid foundation in bioeconomy concepts, providing them with the necessary knowledge and confidence to teach these topics effectively in the classroom using additional tools and resources.

- [Lesson plans](#), structured guides for teaching bioeconomy concepts in the classroom. These lesson plans introduce bioeconomy concepts through discussions, activities, AI tools, and interactive games, making complex topics accessible and engaging for young learners. This resource is available in Dutch, English, German, Greek, Italian, Portuguese, Slovak, and Spanish.
- [Training contents](#), materials designed to strengthen your knowledge of the bioeconomy and its teaching. They reinforce all the other toolkits so teachers can understand the concepts of the bioeconomy in the general framework of the FEE's Environmental Education "ECO-SCHOOLS" Programme. This resource is available in Dutch, English, German, Greek, Italian, Portuguese, Slovak, and Spanish.
- [The Bioeconomy for Educators: Cultivating a Sustainable Future MOOC](#), a free, accessible and self-paced online course to learn about the bioeconomy and how to engage students with the topic, while raising awareness of its benefits and challenges, and preparing them for future job opportunities. Focusing on sustainable solutions and future job opportunities, it aims to provide comprehensive knowledge and practical tools for integrating bioeconomy concepts into teaching practices, while creating innovative and adaptable learning experiences. Access the course on the [European Schoolnet Academy](#) or download it in {link: **PDF format**}. This resource is available in Dutch, English, French, German, Greek, Italian, Portuguese, Slovak, and Spanish.

Eager to learn more?

The [Are you ready for the bioeconomy?](#) online bioeconomy quiz was a resource developed in English in the [Allthings.bioPRO](#) project. It features six multiple-choice questions that are both fun and educational. Answers are instantly graded with explanations, and users can explore further through "Learn more" links.

Remember that this resource and more can be found in the [GenB Library](#).

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Biointeresting fact!

Incorporating bioeconomy concepts into educational activities for children aged four to eight can help develop key skills such as responsibility and critical thinking. Through games and hands-on activities, children learn about the life cycle of products and the importance of reducing waste, fostering their ability to make conscious decisions about consumption and resource use. This helps them understand the value of sustainability and develop a sense of community and collaboration.¹

3 Which GenB tools can help my pre- and early-stage students learn about the bioeconomy?

Resources for teaching the bioeconomy in the classroom

The following materials are designed for use by students. These tools provide teachers with a comprehensive repository to engage students in the teaching and learning process of the bioeconomy.

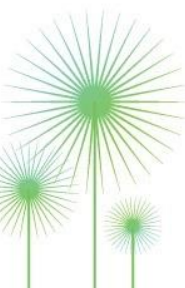
- Storytelling is a powerful tool, and these materials harness its potential.
 - The **book for kids** [“What’s bioeconomy?”](#) introduces the concepts of sustainable and circular bioeconomy with a focus on bio-based products, explained in an easy-to-understand way. This resource is available in Dutch, English, French, German, Greek, Italian, Portuguese, Slovak, Spanish, Romanian, Estonian and Hungarian, Polish, Maltese, Bulgarian and Ukrainian.
 - [“The Apple’s dream” fairy tale](#) explores key bioeconomy concepts such as the reuse and transformation of residues into valuable resources, helping to reduce waste and preserve our planet, through an engaging story and a series of images. This resource is available in English, Spanish, Greek, and Italian.

¹ Rieckmann, M. (2017). *Education for sustainable development goals: Learning objectives*. UNESCO publishing.

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- For audiovisual content, explore the following **educational videos**:
 - [Bio-based products: What is it made from?](#) This resource offers multilanguage subtitles, as automatic translations of the social media captions.
- The [BioHeroes: Let's save the planet! card game](#) uses a game-based learning approach to teach students, over six years old and available for two to six players, about careers in the bioeconomy. It introduces them to various professions, their specific tasks, and how these roles interconnect, all in a fun and practical way. This resource is available in English and Spanish.
- Looking for something more experimental? [Hands-on labs: bioeconomy experiments](#) offer nine practical and fun activities where students over 6 years old can explore various uses for bio-waste and see how it can be transformed into new bio-based products. This resource is available in Dutch, English, Greek, Italian and Spanish.
- Enable students to explore the bioeconomy through audiovisual means with this [participatory photography activity](#). They can narrate, investigate, and raise awareness of real-world bioeconomy applications by taking photos and/or videos. This resource is available in English.

Looking for more resources for my students?

Explore this selection of past bioeconomy projects to help your students delve deeper into the “bio” side.

- {link: “[What's bioeconomy?](#)” video. This resource is available in English.
- {link: “[The Bioeconomy starts here...be part of it!](#)”} video. This resource offers multilanguage subtitles.
- **The online game “[BIO...What?](#)”** enhances young learners’ understanding of the bioeconomy by sparking curiosity and providing information on bio-based products, teaching how raw materials can be used to create everyday items. It’s a great warm-up activity for introducing bioeconomy concepts to elementary students. This resource is available in English.

4 What pedagogical approaches are covered within the GenB Toolkit?

The GenB Toolkit provides flexible resources to accommodate various pedagogical approaches, ensuring that educators can effectively integrate bioeconomy concepts into their teaching, regardless of their style or method. Key pedagogies include the following:

- **Play-Based Learning:** Emphasizes the importance of play as a natural and essential part of childhood learning. Through both structured and unstructured play, children develop cognitive, social, emotional, and physical skills.

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- Inquiry-Based and Project-Based Learning: Encourages students to ask questions, investigate, and solve problems related to bioeconomy through research and hands-on projects.
- Experiential learning: Engages students with practical activities that connect theoretical concepts to real-world applications, deepening their understanding of the bioeconomy.
- Project-based learning: Involves students working on extended projects that require applying knowledge and skills to solve real-world challenges or answer complex questions.
- Differentiated instruction: Offers diverse materials suitable for different learning levels and styles, allowing teachers to adapt resources to their specific goals, curricula, and lesson plans.

5 What competencies can teachers and students gain from the GenB Toolkit?

This educational framework provides students with a deep understanding of bioeconomy principles, fostering critical thinking and practical skills through hands-on activities and real-world applications. By engaging with concepts like sustainability and the circular economy, learners develop essential competencies for responsible decision-making and innovative problem-solving.²

- Understanding of the bioeconomy
 - Learn the basic principles of the bioeconomy, including the production and transformation of renewable biological resources into products such as food, bio-based materials, and bioenergy.
 - Understand the role of the bioeconomy in transitioning to a circular and low-carbon economy.
- Awareness of environmental responsibility and sustainable behaviours
 - Develop a sense of responsibility and awareness of the importance of reducing waste and managing resources efficiently.
 - Understand how daily decisions and individual practices impact the environment and the economy.
- Development of critical and analytical skills
 - Foster critical thinking and the ability to assess the environmental and economic impacts of different practices and products.

² European Commission: Directorate-General for Research and Innovation, Graaf, I., Papadimitriou, A., Peijl, S., Cuartas-Acosta, A., Hüsing, T., Korte, W., Lilischkis, S., Baltina, L., Diego, I., Hogarth, T., Imbert, E., Ladu, L., & Morone, P. (2022). *Promoting education, training and skills across the bioeconomy: policy brief*, Publications Office of the European Union. <https://data.europa.eu/doi/10.2777/026558>

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- Promote problem-solving through research and the design of sustainable solutions.
- Preparation for innovation and the future
 - Explore different professions and opportunities in the bioeconomy field, preparing participants for careers in a growing sector.
 - Apply bioeconomy knowledge to create and adapt innovative solutions to environmental and economic challenges.
- Application of practical knowledge and creativity
 - Use hands-on activities and games to explore bioeconomy concepts, such as the reuse and transformation of waste.
 - Implement projects that integrate sustainability and bioeconomy concepts in real-world contexts.

6 Where can I find additional resources on the bioeconomy?

Remember! The [GenB Virtual Library](#) is a repository of high-quality resources and tools that complements the [GenB Toolkit for four- to eight-year-old students](#). Use the filters to refine your search and discover a wealth of valuable resources!

Inspire change from the classroom

Integrate the bioeconomy into subjects like Nature Studies, Science, and Mathematics to help young students understand the basics of ecosystems, sustainable living, and creative ways to use natural resources.

With these resources, teachers can create a dynamic and inspiring learning environment. The bioeconomy is not only a topic of study, but an opportunity to empower students to be agents of change towards a more sustainable future.

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