Co-funded by the European Union

eduNUT

Futures Literacy on Food Nutrition and Sustainable Food Systems for School Education

The EduNUT Curriculum

TAL TECH

STIMMULI for social change

KORA

BIALYSTOK UNIVERSITY OF TECHNOLOGY

ΕΚΠΑΙΔΕΥΤΗΡΙΑ ΠΛΑΤΩΝ

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NARVA GÜMNAASIUM

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Introduction

Climate change is one of the most pressing challenges of our time, driven by a network of interconnected subsystems. Among them, food systems play a significant role, contributing to approximately one-third of the global greenhouse gas emissions (GHG). Recognizing this, the European Green Deal outlines four key focus areas for Green Transition, one of which is the transformation towards sustainable food systems. These systems encompass the complex interactions between nutrition, food production, health, community development and agriculture.

EduNUT is an innovative educational program that integrates creative methodologies and dynamic resources to engage learners in understanding the nutritional value of food while fostering critical thinking, futures literacy and collaboration. The program is grounded in Futures Literacy, Systems Thinking and Youth Participation methodologies, empowering students to envision and shape sustainable futures in alignment with the **Sustainable Development Goals (SDGs)**. These include promoting a **circular economy (SDG 12)**, **inclusive societies (SDG 11),** and **regenerative and sustainable agriculture (SDG 15)**. Through this approach, students learn that sustainability challenges must be tackled immediately and holistically, synthesizing information and data about Food Systems to act towards sustainable futures of food, society and the planet.

The transformation of young people into critical thinkers, future change makers, and conscious food consumers could be the solution for the systemic change of the current food systems, and overall, Green Transition. Hence, **this project aims to support teachers and students** of secondary education to develop competences from a young **age to actively contribute to the improvement of future food systems.**

Learning objectives

To succeed, the aim of supporting teachers and students with this curriculum is to create specific learning strategies and scenarios to help them understand the complexities of modern-day food systems and develop sustainability competencies.

Knowledge-based learning objectives

The students will be able:

- To understand the foundational principles of sustainable food systems and their impact on personal and planetary health.
- To identify the connections between food systems and global sustainability challenges.
- To comprehend the importance of SDGs, and more specifically those of Circular economy (SDG12), inclusive societies (SDG11), and sustainable agriculture (SDG15) in addressing current and future global issues.

Skills-based learning objectives

The students will be able to:

- To synthesize and critically analyze sustainability-related data and information regarding food systems.
- To utilize systems thinking to assess and address complex sustainability problems.
- To develop futures literacy to create inclusive visions for sustainable food systems and societal well-being.

Behavioral-based learning objectives

The students will be able:

- to explore their own potential to actively contribute to a more sustainable future of food systems and become responsible and literate agents of environmental change.
- To envision alternative sustainable futures by imagining and developing alternative scenarios and identifying the steps needed to achieve a preferred sustainable future
- To foster commitment to contribute to sustainable futures through informed, inclusive and impactful actions.

The Co-design process

Designing a competent curriculum

Schools serve as the primary and mandatory setting for most young people to cultivate essential skills and competencies. As a result, educational systems are increasingly expected to support the development of these competencies. Thus, going beyond traditional academic instruction, it is crucial to instill these skills from an early stage in schools, ensuring that students develop not only subject-specific knowledge but also **metacognitive competencies, values, attitudes, and action-oriented skills**. This is especially relevant in fostering food literacy and a deeper understanding of food systems, enabling students to critically engage with issues related to nutrition, sustainable food systems, and responsible consumption. Education should move beyond the mere acquisition of isolated facts and instead promote experiential learning through interdisciplinary projects and reflective practices, helping students develop the capacity to think critically, imagine alternative futures, make informed choices, and take meaningful action in an increasingly interconnected and changing world.

To that end, the design model behind the eduNUT curriculum is expected to promote experiential learning, and students will have the opportunity to holistically grasp the principles of food and futures literacy.

The eduNUT co-design process

The development of the eduNUT curriculum followed a **co-design process**, bringing together consortium members in a collaborative effort to shape its structure and content. Throughout this process, partners engaged in discussions to define the most effective framework for equipping students with essential green skills, particularly in the areas of food literacy and food systems education. Recognizing the need for an approach that goes beyond traditional subject-based learning, the team explored various methodologies before

ultimately adopting an **alternative form of design thinking,** based on a sequence of 3 distinct phases. This adapted model emphasized **iterative development, interdisciplinary integration, and experiential learning**, ensuring that the curriculum not only provided foundational knowledge but also fostered **critical thinking, exploratory thinking, and action-oriented competences**. By incorporating **reflection, co-creation, and user-centered design principles**, the eduNUT curriculum was structured to support students in actively engaging with food-related challenges, empowering them to make informed choices and contribute to more sustainable food systems.

Design models

An online meeting took place in late May, through which Stimmuli presented the initial idea of the main structure for the EduNUT Curriculum. To facilitate the co-design workshop, Stimmuli used the online tool "MIRO". Stimmuli presented a general overview of the Working Package 4, underlining the steps and actions needed to be taken by partners in order to co-develop an innovative but also easy to implement curriculum. All the partners have participated in the process equally, with BUT, Einurd, Kora and Stimmuli involved in the sessions as experts for content creation, the teachers from Narva Soldino Gümnaasium and Platon Schools, giving their valuable insights and feedback from the field, and finally the coordinators having the overall supervision.

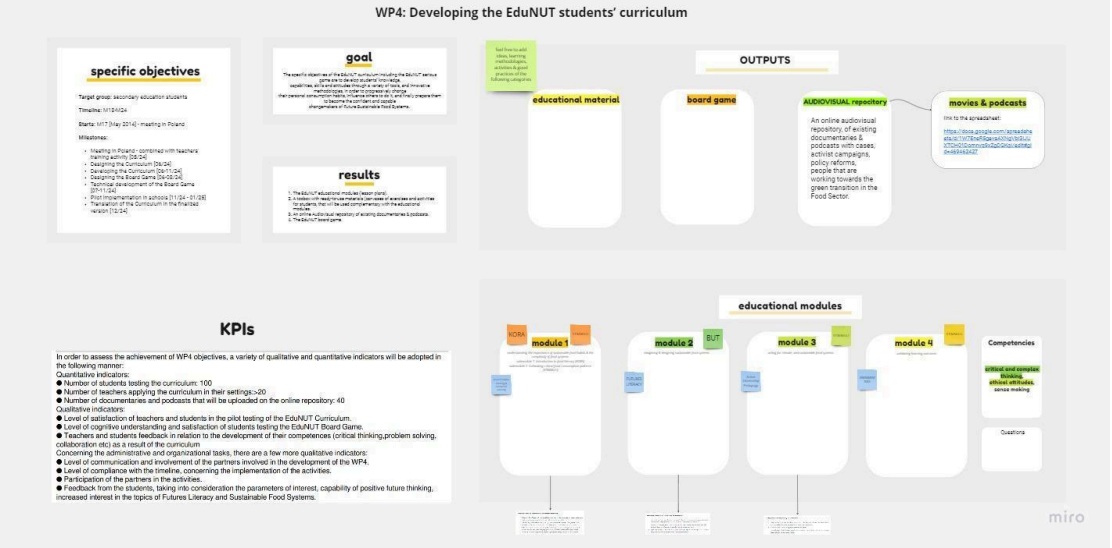

Image 1: own source/Miro board "WP4-Curriculum development overview"

The initial idea presented by Stimmuli, and it is presented below as "Idea 1", follows the structure of 4 learning pillars "Learn - Design - Act - Reflect". The methodology proposed by Stimmuli is inspired by the educational model of Design Thinking and altered in a way to fit specific educational needs. The proposed structures the content by phase, meaning that the different modules are developed adequately following the needs of each phase. Thus, this model has a total number of 5 modules, the 3 first of which comprise the "LEARNing" phase, a module developed under the "DESIGN" phase, and a final module developed under the "ACT" phase. The reflection takes place at the end of each learning session.

The discussion with partners brought many fruitful ideas on the table, all of which were enriched with several characteristics inspired by their national educational systems and experiences. While the partner institutions with research backgrounds brought on the table their expertise about the theoretical basis, while the teachers underlined the importance of practicality of implementation of the curriculum inside the classroom. The first session of the co-design process closed with the formulation of a new curriculum structure, which is presented below as "Idea 2".

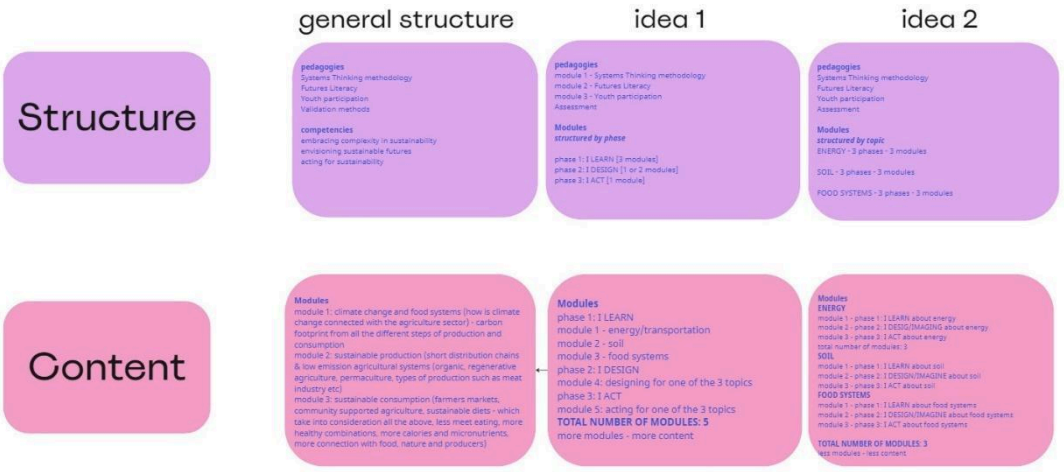

Image 2: own source/Miro board "WP4-Curriculum structure ideas"

Initial Idea

The initial idea is inspired by the Design Thinking model, following a more deliberate and simple structure that could be easily adapted in diverse classes. The educational model is developed by Stimmuli, based on previous experience with a plethora of innovative education projects. This model is simple, offering an opportunity for different content to be structured easily. The learning experience is student-centric, giving the opportunity to students to work collaboratively and by taking an active role in their learning journey. The structure is presented below on a board, as it was presented online in "MIRO".

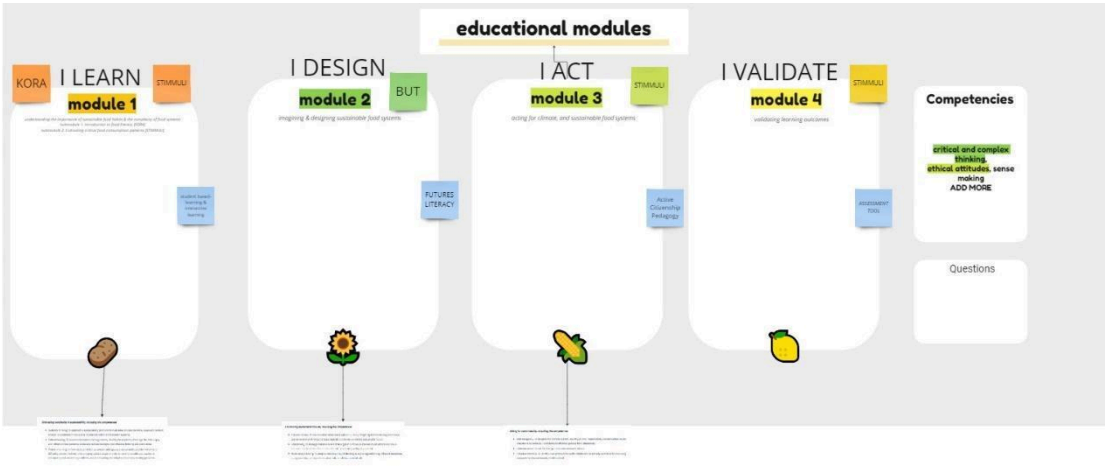

Image 3: own source/Miro board "WP4-Curriculum structure"

The initial idea structures the content by phase, meaning that the different modules are developed adequately following the needs of each phase.

Modules

module	module title	pedagogical methodology	competence
module 1	*understanding the importance of sustainable food habits &*	student-based learning	embracing complexity in sustainability, including competencies (critical

	the complexity of food systems: submodule		thinking, systems thinking)
module 2	*imagining & designing sustainable food system*	futures literacy	envisioning sustainable futures, including competencies (futures literacy, exploratory thinking)
module 3	*acting for climate and sustainable food systems*	youth participation pedagogy	acting for sustainability, including competencies (political action, collective action)

Table 1: own source/modules' structure

Idea 1 – structure by topic

The "idea 1" proposed during the co-design phase follows the structure of "learn-design-act", but it only includes one of the 3 topics (energy, soil, food systems) in the first phase of "learn". The idea derives from the work accomplished in the working package 3, where the content developed under those 3 topics. Thus, following this logic, **the curriculum is structured by topic**, and is composed of a total number of **3 modules.** To that end, the teachers who have taken the teachers' training programme would be able to implement the lesson plans with ease following the same logic as the training, and their preparation time would be shorter.

Modules

The modules follow the process of design, including 3 different packages of modules, each one linked with the topics of Energy, Soil and Sustainable Food Systems. The teachers could work only with one of the 3 different topics, under which a complete set of 3 modules would be developed. The eduNUT curriculum comprises a total number of 3 modules per topic but gives the opportunity of choice to both teachers and students to decide with which topic they want to work.

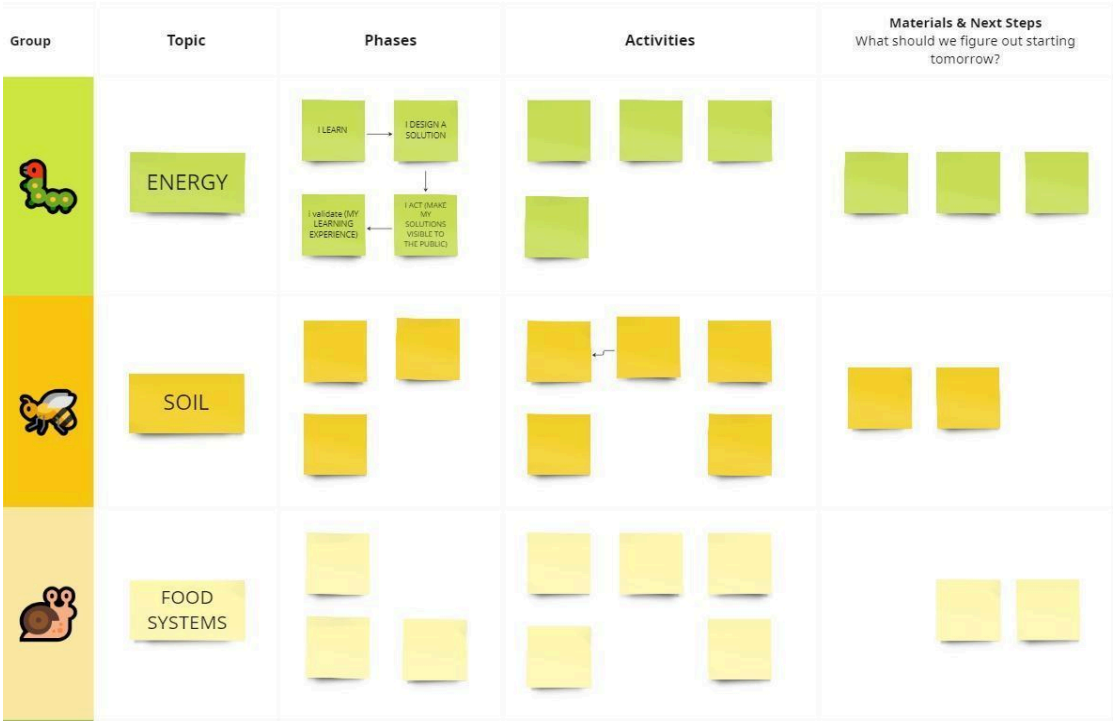

Image 4: own source/MIRO board "idea 1 modules structure"

SWOT analysis

Strengths: A pluralistic content, that is transferable and easier to implement within a diverse educational setting among partner countries.

Weaknesses: A compartmentalized theoretical model can lead to weak systematic thinking competence.

Opportunities: It gives the opportunity to teachers and students to choose the topics that they want to explore in depth, following a more inquiry-based type of education

Threats: It is challenging for the Working Group team to moderate the content; it would need adjustments and deviations from the primer plan.

Idea 2 (adopted) – structure by phase

Combining the initial structure along with "Idea 1", a second idea cultivated and accepted by partners. Based on this idea, the curriculum is **structured by phase**, giving more focus on the importance of the structure of phases, while the content could be adjusted accordingly each time. Thus, a common structure of methodologies and tools is adopted, offering the seedbed for several topics to be addressed and explored, such as the three different topics of the EduNUT capacity building programme.

Modules

This model proposes a total number of **5 modules**, the 3 first of which comprise the "LEARN" phase, a module developed under the "DESIGN" phase, and a final module developed under the "ACT" phase. The reflection takes place at the end of each learning session. Each module is linked with at least one competence, based on the list of identified competencies of the preliminary research done in the phase of the proposal writing. The chosen competencies are based on GreenComp, the European framework for sustainability competencies.

After the implementation of the theoretical part, the design and acting activities complete the lesson plans. Thus, the teacher can choose among the 3 different topics of discussion, engage students into discussions about energy, soil and sustainable food systems, and finally decide (either by themselves or along with their class), with which topics they would further work. In the next phase, students imagine and design their solutions for future food systems and finally complete the lesson plans by advocating for their solutions. Below are presented the proposed titles of the modules, along with the respected competence that is foreseen to be cultivated after the completion of the module.

Area/Competency	Competence	Descriptor
Embracing complexity in sustainability	Systems thinking	To approach a sustainability problem from all sides; to consider time, space and context in order to understand how elements interact within and between systems.
	Critical thinking	To access information and arguments, identify assumptions, challenge the status quo, and reflect on how personal, social and cultural backgrounds influence thinking and conclusions.
Envisioning sustainable futures	Futures literacy	To envision alternative sustainable futures by imagining and developing alternative scenarios and identifying the steps needed to achieve a preferred sustainable future.
	Exploratory thinking	To adopt a relational way of thinking by exploring and linking different disciplines, using creativity and experimentation with novel ideas or methods.
Acting for sustainability	Political agency	To navigate the political system, identify political responsibility and accountability for unsustainable behavior, and demand effective policies for sustainability.
	Collective action	To act for change in collaboration with others.

Table 2. own source/list of competencies

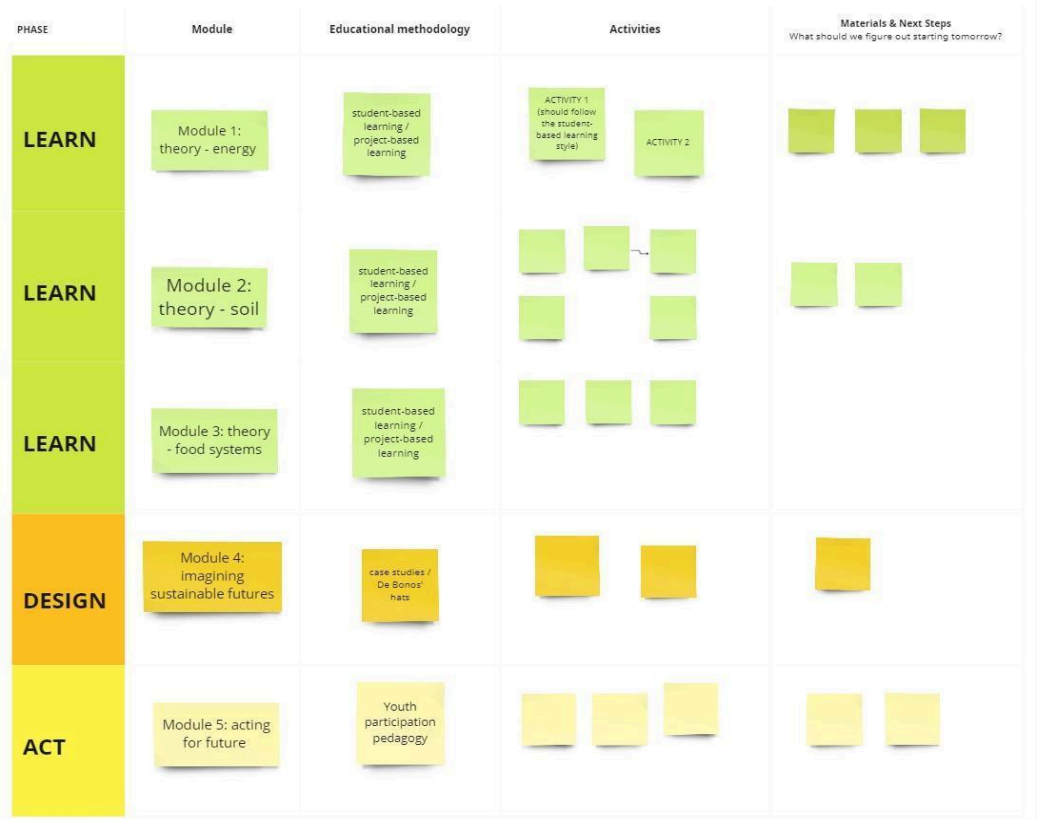

Image 5: own source/MIRO board "idea 2 modules structure"

SWOT analysis

Strengths: The students can learn deeper about the topics addressed in the EduNUT project, including soil, energy and sustainable food systems, increasing their understanding about the complex system of food and nutrition.

Weaknesses: The teachers need to get prepared for different theoretical elements that correspond in each of the topics addressed, such as food, energy, sustainable food systems and diets.

Opportunities: The plethora of several theoretical elements and topics can help the students to work in an inquiry-based model, choosing the topic of their interest to solve.

Threats: The need to address all the different topics could lead to more time spent with theoretical passive learning, rather than group work and student-based activities.

Theoretical background

The EduNUT program's commitment to address environmental and societal challenges is grounded in innovative learning theories and methodologies. Research shows that student-based learning and environmental education fosters long-term behavior change and can enhance empathy towards the environment. The program is developed to encourage students to understand and critically analyze global food systems, examining issues such as transportation and energy mitigation, resource depletions, climate change and youth environmental participation, while offering opportunities for exploration. From practical activities, such as imagining and designing sustainable food systems, or planning community gardens, reinforce theoretical concepts and translate them into tangible learning outcomes. The combination of knowledge acquisition and hands-on activities prepares students to act as informed agents for change for a sustainable future.

Systems Thinking of Education for Sustainability

Systems Thinking provides a structured framework for understanding and addressing the complexities of sustainability issues. It involves analyzing systems in terms of their interconnected components, feedback loops, and interdependencies. According to Maria Hofman-Bergholm systems thinking is required to comprehend the intricate connections in sustainable development. Thus, it is supported that complex reasoning skills must be taught or enhanced as they are not inherent. The National Research Council (NRC, 2010, pp. 63–64) defined systems thinking as "*the ability to understand how an entire system works, how an action, change, or malfunction in one part of the system affects the rest of the system: adopting a 'big picture' perspective on work. It includes judgment and decision-making; system analysis; and systems evaluation as well as abstract reasoning about how the different elements of a work process interact.*"

In the EduNUT program, students learn to view food systems as part of broader socio-economic and environmental structures, that interlink. This approach helps them recognize how factors such as agricultural practices, supply chains, consumption patterns, and waste management are interrelated. Research indicates that integrating Systems Thinking into education enhances problem-solving abilities, promotes adaptive learning, and nurtures innovation. By applying these principles, students can propose holistic solutions that address multiple sustainability challenges simultaneously.

Futures Literacy for imagining sustainable futures

"Futures Literacy is the capacity to explore the potential of the present to give rise to the future." Futures Literacy, as promoted by UNESCO, equips individuals with the ability to imagine and prepare for potential future scenarios.

Futures Literacy as competency enables students to analyze current trends, anticipate uncertainties, and devise strategies that align with their preferred future outcomes. In the context of EduNUT, Futures Literacy empowers learners to envision a future where food systems are equitable, sustainable, and regenerative. By engaging in scenario-building exercises and methods, students can identify actionable steps for achieving goals such as circular economies (SDG12), inclusive communities (SDG11), and sustainable agriculture (SDG15).

The broader field of Educational Futures has critically examined the structural, epistemological, and curricular orientations of schools, emphasizing the limitations of formal education in fostering students' hope and agency during challenging times. Thus, research supports the inclusion of Futures Literacy in curricula as a means of fostering resilience, creativity, and transformative thinking in young learners. Because as John Dewey has states in "Democracy and Education "The concept of education as a social process and function has no definite meaning until we define the kind of society we have in mind."

Empowerment through Youth Participation

Youth participation is a priority in the European Union Youth Strategy, and a central issue for more than 40 years, underlining the importance of the participation of young people in social, political and civic decision making. Youth Participation is a cornerstone of EduNUT's methodology, promoting collective environmental and social action, as a milestone for the fight against climate change. Empowerment through participation has been linked to increased engagement, self-efficacy, and a sense of ownership in learners. By involving students in decision-making, EduNUT not only reinforces their agency but also fosters leadership skills and collaboration. This participatory approach aligns with the principles of transformative pedagogy, which prioritizes critical inquiry and active involvement in real-world issues. The combination of competencies that could lead to responsible action and involvement, can lead students to become aware and active environmental citizens.

Targeted competencies

A competence-based education helps students to develop such green skills based on knowledge and attitudes that can help promote responsible action and stimulate willingness to take or demand action at local, national and global level. To succeed in that, the **eduNUT curriculum** is designed based on the European framework for green competence assessment "**GreenComp**".

GreenComp can support education and training systems in shaping systemic and critical thinkers who care about our planet's present and its future. All 12 competences of the framework are applicable to all learners. Among those 12, the eduNUT curriculum entails the following three: **1. Embracing complexity in sustainability**, **2. Envisioning sustainable futures** and **3. Acting for sustainability**

Competency	Competence	Descriptor
Embracing complexity in sustainability	Systems thinking	To approach a sustainability problem from all sides; to consider time, space and context to understand how elements interact within and between systems.
	Critical thinking	To access information and arguments, identify assumptions, challenge the status quo, and reflect on how personal, social and cultural backgrounds influence thinking and conclusions.
Envisioning sustainable futures	Futures literacy	To envision alternative sustainable futures by imagining and developing alternative scenarios and identifying the steps needed to achieve a preferred sustainable future.
	Exploratory thinking	To adopt a relational way of thinking by exploring and linking different disciplines, using creativity and experimentation with novel ideas or methods.
Acting for sustainability	Political agency	To navigate the political system, identify political responsibility and accountability for

		unsustainable behavior, and demand effective policies for sustainability.
	Collective action	To act for change in collaboration with others.

Table 3. own source/list of adopted competencies

The eduNUT modules overview

Module	Competencies	Educational Methodology implied	Phase
Module 1: energy	embracing complexity in sustainability	Student-based/ project-based learning	I LEARN
Module 2: soil	embracing complexity in sustainability	Student-based/ project-based learning	I LEARN
Module 3: sustainable food systems	embracing complexity in sustainability	Student-based/ project-based learning	I LEARN

Module 4: Imagining sustainable futures	envisioning sustainable futures	Case studies / De Bonos' hats	I DESIGN
Module 5: acting for future	acting for sustainability	Youth participation pedagogy	I ACT

Table 4. own source/list of the eduNUT modules

Lesson plans

Module I – I LEARN about sustainable energy for agriculture.

Duration	*105'*
Competencies	**Embracing complexity in sustainability**
Objectives	• Comprehending renewable and non-renewable energy sources as well as important terms related to sustainability and agriculture • Understanding the practical dimension of using different energy sources in agriculture • Learning through mutual exchange of information
Lesson structure	Activity 1: ice breaker - 5' Activity 2: flashcards - 30' Activity 3: the backwards cheese - 40' Activity 4: renewable energy experts - 25' Activity 5: homework - 5'
Preparation & materials	Plush ball // Cheese toy // A screen and projector // Sheets of A3 paper //Flashcards // Renewable energy cards
Description of the activities	**Activity 1.1.: Guess the green phrase (5 min)** Write a phrase related to sustainable energy or agriculture on the board, replacing each letter with an underscore (_). The phrase could be „sustainable farm". Start by tossing the plush ball to a student. The student who catches the ball guesses a letter or the phrase. If the letter is present in a selected phrase, fill it into the appropriate spaces on the board. The student then tosses the ball to another classmate, who takes the next turn. Each student can have only one chance to answer. The activity ends when a student correctly guesses the phrase. **Activity 1.2.: Flashcards (30 min)** Divide the students into 6 groups. Give each group a set of flashcards* and one sheet of associations paper**. One set will contain seven pictures, names and descriptions of a term. The

students' task will be to match the pictures with the correct name and description. Additionally, each group should write down as many associations as possible to the terms they have identified.

Students will have 15 minutes for this exercise. After that time, show the correct answers on the screen describing each term using the provided presentation. Next, ask each group to read out the associations they have written down for each term.

*Print and cut out the flashcards from the appendix in advance.

**Print the right document from the appendix.

Tip! Encourage students to write down as many associations as possible with each term. Explain that there are no wrong associations.

<u>Activity 1.3.: The backwards cheese (40 min)</u>

Divide the students into 6 groups. Give each group one toy cheese and a sheet of blank A3 paper. Ask the students to place the cheese in the center of their paper. Explain that their job is to create a web map around the cheese listing all the activities and places where energy was used to produce that cheese. After 5 minutes ask the students to change the desk at which they are working so that each group is in front of another group's paper. Repeat this after another 5 minutes of work (there should be 3 rounds in total).

Then, ask students to turn their sheet of paper to the other side and place the cheese in the middle. Explain that this time they should think forward and write where energy could be used before the cheese is finally consumed. Again, give the students 5 minutes in the beginning and then ask them to switch to another desk (there should be 2 rounds in total).

After the last round (5 rounds lasting 5 minutes – 25 minutes in total) ask students to share the answers by playing "Back and Forth" – one group starts by saying the first item on their map, next group shares one of their energy inputs without repeating. Write each energy input on the blackboard for everyone to see. Continue calling on groups until there are no more energy inputs.

Tip! The last group that adds new energy input could win some small prizes.

	Tip! If students have trouble starting this activity you can give a few examples from the list: *refrigeration at the grocery store, transportation, cleaning, packing, feeding the cow, housing the cow, providing water for the cow, refrigerating the milk, delivering food for the cow* and so on. **Activity 1.4.: Renewable energy experts (25 min)** Divide the students into groups, each containing 5 students. Each group gets one set of renewable energy cards* – one for each student. The cards will contain a description of the renewable energy source, as well as its pros and cons. Give students 3 minutes to read the information on their card and to ask questions if necessary. After this time give each group the card with a case description* of the case on which they are going to work: *You own a dairy farm with 200 cows. The farm requires energy for:* • *Heating and cooling the barns to ensure the animals' comfort.* • *Powering milking machines and refrigeration for milk storage.* • *Your location experiences moderate weather but occasional heatwaves and cold spells.* The students' job is to decide which energy source (or energy sources) would be best in a given situation. After 10 minutes, the groups ask to present their solution. Discuss the final conclusions. ***Print the energy cards and the case description from the appendix.** **Tip!** The important part is to discuss not the chosen energy but the "why's". **Activity 1.5.: Homework explanation (5 min)** Explain that the homework will be to watch a video on agrivoltaics and based on this, write what agrivoltaics is and what its advantages and disadvantages are. Video link: https://youtu.be/ygnfNgvE1pM?si=-MlH_p-El_YxeQzv
Assessment	Use the assessment sheet from the appendix.

Module II – I LEARN about soil.

Duration	*45'*
Competencies	Embracing complexity in sustainability
Objectives	By the end of this lesson, students will understand the importance of soil in ecosystems, basic soil composition, and the role of soil in plant growth and food production.
Lesson structure)	**Introduction to Soils** By the end of this lesson, students will understand the importance of soil in ecosystems, basic soil composition, and the role of soil in plant growth and food production. Activity 1: Introduction to Soil (10 minutes) Activity 2: Soil Composition Activity (10 minutes) Activity 3: Soil Experiment: Jar Test (15 minutes) Activity 4: Discussion and Q&A (5 minutes) Activity 5: Reflection & Wrap-up (5 minutes) Assessment: Self-reflection - 10'
Preparation & materials	• Samples of sand, clay, and silt • Clear jars with lids (one per group if possible) • Water for the jar test • Soil observation worksheet from *Permaculture Soil Workbook* • Optional: poster or digital slide showing soil as a habitat for microbes and organisms
Description of the activity	<u>Activity 2.1.: Introduction to Soil (10 minutes)</u> o Begin with a brief discussion on what the soil is and its significance. o Ask students, "Why do you think soil is important to us and the environment?" Encourage a few responses. o Use a slide or poster showing images of healthy soil ecosystems, including earthworms, microbes, and roots, to visualize soil as a living ecosystem. <u>Activity 2.2.: Soil Composition Activity (10 minutes)</u>

	o Explain the basic components of soil: minerals, organic matter, water, and air. o Distribute small clear containers with samples of sand, clay, and silt. Let students observe and feel each type of soil particle. o Discuss how different soils can feel and how they impact plant growth. <u>Activity 2.3: Soil Experiment: Jar Test (15 minutes)</u> o Demonstrate a simple soil jar test, using a mixture of local soil and water in a clear jar to observe soil layers. o Guide students in making predictions about what will happen when the soil settles. o Explain that this experiment helps identify soil texture by showing the proportions of sand, silt, and clay. o **Alternative Activity**: If materials for the jar test are unavailable, have students sketch the layers of soil (topsoil, subsoil, and bedrock) and label the components. <u>Activity 2.4.: Discussion (5 minutes)</u> o Review what students have learned about soil composition and importance. o Discuss the connection between healthy soil and food production, emphasizing that most of our food depends on healthy soil ecosystems. <u>Activity 2.5.: Reflection & Wrap-up (5 minutes)</u> o Pass out a worksheet from the *Permaculture Soil Workbook* for students to record their observations from the jar test, make notes, and write a short reflection on why soil is important. o Encourage students to consider how they can help protect and improve soil quality, referencing principles from the *Permaculture Ethics Workbook*.
Assessment	• **Observation Worksheet**: Review students' worksheets for their understanding of soil composition and the importance of soil. • For homework or further exploration, provide students with sections from *Building Soil with Worms* to learn about vermiculture and how earthworms contribute to soil health. Alternatively, students could start a soil journal to document soil samples they find at home or around their neighborhood.

Module III – I LEARN about sustainable food systems

Duration	*90' to 110'*
Competencies	*Understanding and designing sustainability in Food Systems*
Objectives	1. Introducing students to food systems and their role in daily life 2. Analyze the journey of a food item from production to consumption 3. Identify challenges in food systems, including their impact on health and the environment 4. Explore sustainable farming and diets 5. Encourage students to reflect on personal food choices and propose solutions
Lesson structure	Lesson 1: Introduction to Food Systems • Activity 1.1 – Interactive Book & Flashcards (15 min) • Activity 1.2 – The Journey of a Specific Food (20 min) • Activity 1.3 – Analysis Diagram: Understanding the Food System (10 min) Lesson 2: Exploring Challenges & Solutions in Food Systems • Activity 2.1 – Group Work: The Impact of Food Systems (25 min) • Activity 2.2 – Reflection: The Impact of Our Food Choices (10 min) • Activity 2.3 – Interactive Video: Sustainable Farming (10 min) • Activity 2.4 (Optional) – Wrap-Up Discussion: Where else can we learn about food systems? (10 min)
Preparation & materials	Projector/computers for interactive book. Click on Interactive Book - Food Systems to access it Flipchart paper/markers for group diagrams Printed food system diagrams for class discussion Group worksheets with guiding questions. Appendix

	Flipchart paper/markers for presentations Projector/computers for interactive video on sustainable farming. Click on Flipchart paper/markers to access the video. Printed Venn diagram for wrap-up discussion. Appendix
Description of the activities	**Lesson 1: Introduction to Food Systems** **<u>Activity 3.1.: Interactive Book & Flashcards (15 min)</u>** Introduce the lesson by asking students: *"What comes to mind when you hear the term food system?"* *"How do we get the food that we eat?"* Tell students they will watch an interactive book about food systems Play the video, pausing at key moments when questions appear. Facilitate a short discussion after each pause, ensuring students reflect on key points. After the video, use flashcards to reinforce important terms. Call on students to define key concepts and provide real-life examples. **<u>Activity 3.2.: The Journey of a Specific Food (20 min)</u>** Divide students into small groups (3-4 per group). Assign each group a specific food item (e.g., banana, rice, cheese). Explain their task: Trace the journey of their food item, answering: *Where is it produced?* *What processing does it undergo?* *How is it transported?* *Where is it sold?* *What happens after consumption?* Students create a visual representation (poster or digital diagram). Each group presents their findings in 2 minutes. Lead a class discussion*:* *"What surprised you about your food's journey?"* *"What factors influence where our food comes from?"*

<u>Activity 3.3.: Analysis Diagram: Understanding the Food System (10 min)</u>

Distribute food system diagrams to students.

Ask students to compare the general food system model to their food's journey.

Guide a discussion with the class:

"What patterns do we see in food systems?"

"Where are inefficiencies (e.g., food waste, emissions)?"

"How do different parts of the system interact?"

Lesson 2: Exploring Challenges & Solutions in Food Systems

<u>Activity 3.4.: Group Work: The Impact of Food Systems (25 min)</u>

Divide students into three groups, assigning each a challenge:

Health Impact

Environmental Impact

Sustainability of Food Choices

Hand out guiding question worksheets and explain:

"Your group will explore this challenge, answer the questions, and prepare a 2-3 minute presentation."

"Your have 15 minutes for discussion and research".

Each group presents their findings to the class.

Encourage students to ask follow-up questions to other groups.

Wrap up with a class reflection:

"How do these challenges connect to our daily food choices?"

<u>Activity 3.5.: Reflection: The Impact of Our Food Choices (10 min)</u>

Begin a class discussion by asking:

"What factors influence your food choices?"

"What small changes could you make to eat more sustainably?"

"How do advertising and marketing affect our food habits?"

Let students share their thoughts in an open discussion.

Summarize key insights and ask:

"What is one action you will take after today's lesson?"

<u>Activity 3.6.: Interactive Video: Sustainable Farming (10 min)</u>

	Introduce the video: *"This video will show examples of sustainable farming practices."* Play the video, pausing at key points to ask: *"What challenges do farmers face?"* *"What are some innovative farming solutions?"* *"How does sustainable farming differ from conventional farming?"* After the video, students pair up and discuss what they learned. Hold a short class discussion to share insights. **Activity 3.7.: (Optional) – Wrap-Up Discussion: The Role of Food Systems Everywhere (10 min)** Distribute Venn diagrams with subjects taught at school. Ask students in pairs to choose one area and reflect about what they could learn in those subjects about food systems.
Assessment	Student Presentations Debriefing Crossword Interactive Video

Module IV – I DESIGN solutions for sustainable futures

Duration	*90'*
Competencies	**Envisioning sustainable futures**
Objectives	• conscious searching for new, alternative solutions by means of creative thinking • Learning the importance of redefining the focus • developing your own creative solutions of the problem • exploring factual, creative, optimistic, cautious, emotional, and strategic viewpoints
Lesson structure	Activity 1: Ice breaker - 5' Activity 2: Introduction - 10' Activity 3: Creative thinking workshop (De Bono Six Thinking Hats Technique) - 40' Activity 4: Presentation of considerations - 10' Activity 5: Homework - 5'
Preparation & materials	A screen and projector The principles of lateral thinking and the six de Bono hats technique (appendix) Case study example (appendix) GreenCity dilemmas (appendix) 6 thinking hats table (sheets of A3 paper) (appendix) 6 hats: white, red, yellow, black, green and blue (if feasible, can be even paper)
Description of the activities	**Activity 4.1.: Icebreaker (5 min)** **Start with a quick question**: Ask the students, "How did you travel to school today?" • Let them raise their hands or share their answers briefly. Options might include walking, biking, taking the bus, carpooling, or being driven alone. **Engage with a fun twist**:

- Divide students into groups based on their modes of transport.
- Challenge each group to come up with one advantage of their mode of transport (e.g., walking is healthy, the bus is eco-friendly) and one way to make it more sustainable (e.g., carpooling or using electric vehicles).

After sharing, pose a thought-provoking question:

- "If you could redesign your commute to make it completely sustainable and fun, what would it look like?"
  Encourage creativity, for example: flying bikes, solar-powered buses, or other imaginative ideas!

Wrap-Up Reflection:

Conclude by sharing one key fact about sustainable transport (e.g., "Did you know that cycling emits 10 times less CO2 than driving a car?") and encourage students to think about how small changes in transportation choices can positively impact the planet.

Activity 4.2.: Introduction (10 min)

> Divide the students into groups (the minimum number of students should be 3 in one group).

> Introduce the main assumptions of the Six thinking hats technique:

Six Thinking Hats by Edward de Bono is a tool that helps make better decisions by analyzing a problem from different perspectives. The concept of lateral thinking assumes the assessment of a given phenomenon from various points of view. This approach, according to the author, allows for a conscious search for new, alternative solutions by means of creative thinking. In order to make the different thinking styles easier to remember and to use, the author of this method assigned each style a hat with a corresponding color: white, red, yellow, black, green and blue.

> Explain to students that metaphorically "wearing" each of the six hats, can help us to examine the topic from multiple angles. Each hat represents a unique way of thinking, helping us address dilemmas, generate ideas, and find balanced solutions for adopting more sustainable eating habits. Each "hat" represents a different approach to the problem. Below is an example case that can be used to illustrate this method, along with sample answers for each hat.

> Introduce the participants to the principles of lateral thinking and the six de Bono hats technique (appendix).

*Print the worksheet from the appendix on A3 paper (the number of print copies should match the number of groups).

Activity 4.3: Creative thinking workshop (De Bono Six Thinking Hats Technique) (40 min)

Encourage everyone to get involved actively. Foster a supportive atmosphere where participants feel confident that there are no correct or incorrect answers, and that every idea is valuable and could influence the final outcome of the decision-making process. After introducing your students to Edward de Bono's Six Thinking Hats technique and explaining its purpose, you can move on to introducing the example of adopting the six Bono thinking hats techniques to solve the problem creatively.

Display the proposed case study (appendix). If possible, you can print the template at A3 papers with the proposal (appendix).

Now you can move on to presenting the dilemma to be solved by the participants in groups. Read the Sustainable Transportation for Pupils in GreenCity case and dilemmas (appendix).

Encourage your students to approach the problem from various angles by using the six different thinking hats. If feasible, you could bring in actual colorful hats for the students to use! Explain that this technique helps uncover factors that might be overlooked with traditional thinking styles, offering participants a more comprehensive view of the issue at hand.

Task for participants: to help GreenCity's government make an informed decision regarding the implementation of sustainable transportation for students by applying De Bono's Six Thinking Hats approach to the stated dilemmas.

When changing the hat, the students can use the following questions:

WHITE - Facts, Figures, Data, Information

- What do we know?
- What data do we need to get?
- What are the specifics?

RED - Emotions, feelings, premonitions, intuition

- What do we feel about this matter when we think about it?

YELLOW - Benefits, advantages, profits, savings

- Why is it worth doing this?
- What will be the benefits?
- Why will it pay off?

BLACK - Caution, assessing the truthfulness, judging, checking, verifying the facts

- Will it work?
- Will it be safe?
- Is it possible?

GREEN - Investigating possibilities, inquiry, searching, suggestions, propositions, ideas, innovations, alternative solutions

- What can you do?
- Can it be done in a different way?

BLUE - Investigating possibilities, inquiry, searching, suggestions, propositions, ideas, innovations, alternative solutions

- What can you do?
- Can it be done in a different way?

**Print the right documents from the appendix.

Activity 4.4: Presentations of considerations (10 min)

The representatives of each group read the content from each color of the hat. Then the conclusion and the suggestion for the government should be stated by them.

Activity 4.5: Homework explanation (5 min)

1. Design a crossword puzzle with at least 10 clues and answers related to sustainability. Here are some ideas for words to include:

- Recycling
- Composting
- Renewable energy
- Eco-friendly
- Carbon footprint
- Biodiversity
- Upcycling

For each word, write a clue that relates to its role in sustainability.
For example:

- Word: Recycling
- Clue: "The process of converting waste into reusable materials.

OR

	Reflect on personal habits and identify ways to become more sustainable. Track up your daily habits for one day (e.g., how you travel, what you eat, how you manage waste). Identify three actions that could be made more sustainable. For example: "*Instead of driving to school, I could bike or walk."* *"I can start composting food scraps."* Write a short reflection (150–200 words) on how these changes could positively impact the environment.
Assessment	Use the assessment sheet from the appendix

Module V – I ACT for a sustainable future.

Duration	*100'*
Competencies	**Acting for Sustainability**
Objectives	• To navigate the political system, identify political responsibility and accountability for unsustainable behavior, and demand effective policies for sustainability. • To act for change in collaboration with others.
Lesson structure	Activity 1: ice breaker - 10' Activity 2: climate action case studies - 20' Activity 3: plan our climate action (group exercise) - 30' Activity 4: prepare our climate action - 30' Activity 5: Assessment - 10'
Preparation & materials	Collection of case studies (appendix) Worksheet "plan our climate action" (appendix) A screen and/or projector
Description of the activities	**Activity 5.1.: The protesting penguins and flamingos (10min)** Start standing. Explain that a Flamingo hunts the protesting Penguins and they turn into Flamingos as a consequence. Demonstrate how a Flamingo – one arm is raised to imitate the Flamingo 's head – lifts its knee with slow, swinging movements, while a Penguin is walking with waddling, fast, small steps and protests. With a peck on the head of the Penguin, the Flamingo transforms Penguins into freshly created Flamingos that now hunt remaining Penguins. Choose a player to be the first Flamingo, tell all Penguins to run. Lastly, explain when Penguins can come together and form an alliance the Flamingos cannot turn them. **Activity 5.2.: Youth activism in action - Case studies (15min)** In this activity, students explore the intersection of sustainable food systems and youth activism. Using the list of compelling case studies located in the appendix, highlighting young activists who are making a difference in their communities, students will gain

insights into innovative approaches to sustainability and get inspired to act themselves.

Present the case studies using a screen, and invite students to keep notes during the presentation, using the following triggering questions:

- *What do you find intriguing in most cases?*
- *Which case inspired you the most?*

*The list with case studies is in appendix.

Activity 5.3.: Plan our climate action

Try to explain this to your students and make them realize they can use creative ways of activism to express themselves and act towards a more environmentally friendly and sustainable future.

Use the activity sheet that you can find in the appendix. For more details on the Diagram, you can check the link of the creator Ayana Elizabeth Johnson.

Explain the Venn diagram to students, start by explaining the circles, and ask the students to complete their own Venn Diagram of climate action.

Tip! You can use the following to explain the Venn Diagram in different words.

- The first circle is for your joy - the things that make you feel content and excited.
- The second circle is for what you already know, and you are good at - your competencies, skills, strengths and experiences.
- Third circle is for what needs to be done - the actions that can help to decide upon your climate action.

After that, ask students to think of actions of activism related to environmental problems and food production and consumption and ask them to write down their ideas. Support them to be creative and start a conversation encouraging them to express all their ideas.

Tip! Look for effective ways to make their suggestions a reality. Furthermore, it would be quite useful to keep their suggested activities for possible future use.

Activity 5.4.: Prepare our climate action

	The last activity aims to encourage students to continue with their plan, focusing on the ways and tools that are more relevant to their climate action. The objective is to help students plan, and work in cooperation considering all the different experiences and ideas. Ask the students to use the worksheet "planning our action", that can be found in the appendix. Encourage them to think about all the steps, and plan as they have to implement it in real life.
Assessment	Use the assessment sheet from the appendix.

Assessment

To evaluate students' learning outcomes after participation in the piloting activities, two evaluation tools have been developed to assess students' learning. The first tool aims to encourage students to assess themselves, and the second one is for teachers to assess their students. The tools aim to collect information on the overall satisfaction of students and teachers with educational activities. The tools are presented below with more details, and tips for their use.

Self-assessment (for students)

1. *Self-assessment - daily self-reflection*

This worksheet targets students who have used EduNUT educational materials. It aims to collect information on the learning process and trace students' overall satisfaction with the activity. Students report their views by marking the box that describes best how they feel about the lesson/activity they participated in.

Descriptor	Definitely not	Relatively not	Not sure	Relatively yes	yes
I found this lesson/activity difficult.					
I liked this lesson/activity a lot.					
It was clear enough/activity what I had to do.					
I am content with what I have gained through this lesson/activity.					

Table 4. own source/self-assessment matrix

2. *Summative self-assessment*

The summative self-assessment rubric for students aims to evaluate their learning and encourage them to self-reflect on the competences gained by the activity. The descriptors are aligned to the sustainability competences of the EduNUT curriculum, reflecting aspects of all the learning scenarios. Thus, it can be used as such or modified by the teachers to fit into their purposes.

Descriptor	Definitely not	Relatively not	Not sure	Relatively yes	Yes
I can approach the sustainability problem of food systems from all sides.					
I can assess information and arguments, and reflect on how personal, social and cultural backgrounds influence thinking.					
I can envision alternative sustainable futures for the food systems.					
I can combine knowledge and resources to understand sustainability challenges.					
I can propose new ideas for sustainability.					
I am motivated to work with others to create a more sustainable future.					

Table 5. own source/summative self-assessment matrix

Summative Teachers' Assessment

The summative teacher's assessment rubric is designed to help teachers evaluate the competencies gained by their students after the activity completion. Each learning module is designed to enhance 2 sustainability competencies, based on the GreenComp assessment framework. The competencies may overlap among modules, although that does not affect the overall learning outcomes, since each module is designed to stand as an individual learning scenario. The descriptors of each competence include the 3 distinctive aspects of Knowledge formation, Skill acquisition and Attitude development.

*Important note: The sustainability rubric presented below, has been developed as such for the purposes of the EduNUT curriculum. Although, it is suggested that educators can modify it, based on their needs. The first column describing the descriptors should remain as such, while the levels' descriptions can be altered and be more precise on content, in order to be linked in with specific activities.

Sustainability Competence	Descriptor	level 1	level 2	level 3
Systems thinking	(K) Knows that human action has environmental, social and economic impact on systems.	My students do not easily recognize the ways in which human activity can impact food systems.	My students know that human activity has an impact on food systems, but not specifically about the social, environmental, and economic aspects.	My students know that human activity and decisions have an environmental, social and economic impact on food systems.
	(S) Can assess how the different steps of a system interact.	My students cannot assess the interactions of the different steps of food production.	My students miss some of the steps of food production, while focusing on others.	My students can assess how the different steps of food chain production interact.
	(A) Is concerned about the short and long-term impacts of human actions on others and the planet.	My students are not concerned about the impacts of unsustainable food systems.	My students are more concerned about the impact of unsustainable food systems on the environment.	My students are concerned about the impacts of unsustainable food systems.
Critical thinking	(K) Knows that our understanding of sustainability is always evolving.	My students believe that sustainability is a narrow concept like environmental protection.	My students know that our understanding of sustainability is the status.	My students know that our understanding about sustainability is evolving.

	(S) Is curious and inquisitive about links between the environment, human action and sustainability of food systems.	My students are not curious about the causes that harm the sustainability of food systems.	My students are aware but not curious about the links between human action and sustainability of food systems.	My students are curious and inquisitive about the links between the environment, human action and sustainability of food systems.
	(A) Is willing to accept and discuss sustainability questions.	My students are not eager to discuss sustainability questions.	My students are willing to discuss sustainability questions but not very eager to engage in discussion about it.	My students are willing to accept and discuss sustainability questions.
Futures Literacy	(K) Knows that scenarios can inform decision making for a desired sustainable future.	My students don't know that scenarios can inform decision making.	My students are eager to learn to use scenarios to inform their decision making for a desired sustainable future.	My students know that scenarios can inform decision making for a desired sustainable future.
	(S) Can envisage alternative futures for sustainability.	My students cannot imagine what a sustainable future would look like.	My students can think of some parameters to plan a sustainable future.	My students can envisage alternative futures for sustainability.
	(A) Is concerned about the impacts of one's own action on the future.	My students are not concerned about their current actions' impact on the future.	My students think of the impacts of some of their actions on the future.	My students are concerned about the impact of their own actions on the future.

Exploratory thinking	(K) Knows the main concepts of circular economy and society.	My students don't know about the circular economy and society.	My students have heard of the concept of circular economy and society but cannot properly describe them.	My students know the main concepts of circular economy and society.
	(S) Can synthesize sustainability-related information and data.	My students are not able to synthesize and read sustainability-related scientific data.	My students can understand but not synthesize sustainability-related data.	My students are confident to synthesize and read sustainability-related information and data.
	(A) Dares to make unusual choices.	My students think and make predictive choices.	My students think outside of the box, but do not always act on their choices.	My students have decided to make unusual choices.
Political agency	(K) Knows the relevant political stakeholders for sustainability in one's own community.	My students do not know any local political stakeholders.	My students know which political stakeholders work with community and sustainability issues.	My students know the relevant political stakeholders for sustainability in one's own community.
	(S) Can engage in democratic decision making and civic activities.	My students often argue and cannot easily take decisions informed by equity.	My students are willing to engage in civic activities but there are not many opportunities to do so.	My students can engage in democratic decision making and civic activities.
	(A) Is committed to becoming an agent of change to achieve sustainability.	My students are concerned about sustainability, but don't believe that they can make any changes to it.	My students are willing to become agents of change to achieve sustainability.	My students are committed to becoming agents of change to achieve sustainability.
Collective action	(K) Knows how to work with diverse participants to create inclusive visions for a	My students don't have the skills to work with diverse participants to	My students know some activities that can help a diverse group	My students know how to work with diverse participants to

	more sustainable future.	create more inclusive versions for a more sustainable future.	work together to create a more inclusive and sustainable future.	create inclusive visions for a more sustainable future.
	(S) Can work collectively in sustainability change processes.	My students prefer to work by themselves in sustainability change processes	My students can be guided to work with other people in sustainability change processes	My students can work collectively in sustainability change processes.
	(A) Is motivated to collaborate to shape inclusive sustainable futures.	My students prefer to work by themselves to shape inclusive sustainable futures.	My students are willing but hesitant to collaborate to shape inclusive futures.	My students are motivated to collaborate to shape inclusive sustainable futures.

Table 6. own source/Summative teachers assessment matrix

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