



Erasmus+ Programme Teacher Academy Project-
Teaching Sustainability

TEACHING SUSTAINABILITY: a Compendium of TAP-TS Learning & Teaching Packages

An educators' resource for building teaching
sustainability competence

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Compendium of TAP-TS Learning & Teaching Packages: Educators' Guidebook in building their teaching sustainability competence

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Learning Teaching Packages are available as free to download Open Educational Resources on our Moodle platform. Here you can also find additional information about the project, partners and activities in addition to links to social posts and communities of practice.

TAP-TS Platform
<https://tap-ts.eu/>





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SECTION 1 INTRODUCTION

1.1 FOREWORD



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“Education for Sustainable Development (ESD) is key to the urgently needed transition to more fair and sustainable futures. Educators are tasked with engaging children and young people with some of the most complex challenges ever faced by humanity and to be part of transforming education itself. Over the past three years, Teacher Academy Project-Teaching Sustainability has brought together an interdisciplinary community of primary and secondary level educators from across Europe to learn and develop resources for sustainability education through four online workshops, four hybrid active learning events and three face-to-face summer schools. The quality and breadth of the seven Learning and Teaching Packages presented in this compendium attests to their expertise, innovation and professional engagement. We hope that the LTPs will inspire many others to get involved with teaching sustainability.”

As TAP-TS Team, we also would like to thank all the student teachers, teachers, school principals and teacher educators who have been part of TAP-TS experience. Teachers and teaching are at the heart of every aspect of TAP-TS. TAP-TS was the first academy to include schools and their teachers as full and equal members of the partnership. Both teacher-partners and teacher-participants in our TAP-TS learning events had defining roles in validating and finalizing LTPs as project outputs. For the TAP-TS project, this level of involvement has been extremely beneficial and well worth any extra investment of time and support required.

1.2 BACKGROUND

Teacher Academy Project-Teaching Sustainability (TAP-TS) is one of 11 inaugural Erasmus+ Teacher Academies running from June 2022 until July 2025. Erasmus+ Teacher Academies aim to support the internationalisation of teacher education and the testing of different models of mobility, in addition to strengthening teacher education policies and practices and building sustainable partnerships between teacher education providers ([European Commission, 2024](#)).

The TAP-TS consortium comprises 11 partners from 7 European countries, coordinated by the Centre of Teacher Education and Education Research at TU Dresden, University of Technology. This includes two secondary schools (Friedrich Schiller Gymnasium, Pirna, Germany; and Kings Hospital School, Dublin, Ireland), four higher education institutions providing initial teacher education (TU Dresden;



TU Darmstadt, Germany; Pedagogical University Vienna, Austria; Pedagogical Institute Santarem, Portugal and University College, Dublin, Ireland), a Ministry of Education agency providing continuous professional development (Cyprus Pedagogical Institute, Cyprus), an education technology company (EUMMENA, Belgium), a sustainability education civil society organisation (CorEdu, Leipzig, Germany) and the project evaluation team (K and R Education, Sweden).

TAP-TS aims to engage educators with sustainability values, topics and pedagogical approaches, as part of an interdisciplinary and international community of practice, in order to strengthen their competences for 'teaching sustainability'. Through a series of online, hybrid and face-to-face professional learning events, primary and secondary level student teachers, teachers and teacher educators from across Europe have contributed to the design of 7 Learning and Teaching Packages (LTPs) for use in teacher education and in schools.

The TAP-TS Learning and Teaching Packages (further LTPs) are in essence Learning and Teaching Programmes that include sets of open and flexible learning & teacher materials, co-developed and validated by the TAP-TS Partnership. Firstly, the LTPs are planned as formalised modules that can be taken and freely adopted / adapted by teacher education institutions across the European Union. Secondly, they include materials and resources for teachers to directly implement in their classrooms, with needed adaptations. The core purpose of the LTPs is to motivate, build confidence, and provide teacher educators, teachers, and student teachers with high-quality, materials, ideas, and other practical support on educating for a greener, more sustainable Europe. These materials have formed the foundations for the TAP-TS Academy activity over the life of the project. The seven LTPs are:

- A Sustainable Europe for teacher education and Secondary Teachers;
- Sustainability and Digitality for Primary Teachers;
- Environmental Education and Science Technology Engineering Art and Mathematics (STEAM) for Primary Teachers;
- Climate Crisis Resilience through Serious Games for Secondary Teachers;
- Dealing with Climate Disinformation for Secondary Teachers;
- Green Citizenship in/for Europe and Whole School Approaches for Secondary Teachers; and
- Sustainable Entrepreneurship Education (SEE) for Primary and Secondary Teachers.¹

The LTPs cover a range of interdisciplinary sustainability themes, including: (anti) discrimination, climate crisis resilience, critical media literacy, digitality, decoloniality, environmental education, entrepreneurship education, and linguistic

¹ They are available to download as Open Educational Resources from the TAP-TS Moodle platform (www.tap-ts.eu).



and cultural diversity. Professional learning activities has been informed by research-based insights around teacher professional learning and education for sustainability.

Our understanding of sustainability challenges, and the role of education in meeting these challenges is informed by the Berlin Declaration on Education for Sustainable Development; Learn for our planet: act for sustainability ([UNESCO, 2022](#)). Articles two to four are reproduced below:

“2. We are convinced that urgent action is needed to address the dramatic interrelated challenges the world is facing, in particular, the climate crisis, mass loss of biodiversity, pollution, pandemic diseases, extreme poverty and inequalities, violent conflicts, and other environmental, social and economic crises that endanger life on our planet. We believe that the urgency of these challenges, exacerbated by the Covid-19 pandemic, requires a fundamental transformation that sets us on the path of sustainable development based on more just, inclusive, caring and peaceful relationships with each other and with nature.

3. We are confident that education is a powerful enabler of positive change of mindsets and worldviews and that it can support the integration of all dimensions of sustainable development, of economy, society and the environment, ensuring that development trajectories are not exclusively orientated towards economic growth to the detriment of the planet, but towards the well-being of all within planetary boundaries.

4. We are confident that Education for Sustainable Development (ESD), anchored in SDG 4.7 and as an enabler for all 17 SDGs, is the foundation for the required transformation, providing everyone with the knowledge, skills, values and attitudes to become change agents for sustainable development. ESD enables learners to develop their cognitive and non-cognitive skills, such as critical thinking and competences for collaboration, problem solving, coping with complexity and risk, building resilience, thinking systemically and creatively, and empowering them to take responsible action as citizens, fulfilling their right to quality education as defined in SDG 4 -Education 2030. We believe that ESD must be based on and promote respect for nature, as well as human rights, democracy, the rule of law, non-discrimination, equity and gender equality. In addition, it should promote intercultural understanding, cultural diversity, a culture of peace and non-violence, inclusion and the notion of responsible and active global citizenship.”

UNESCO (2022) Berlin Declaration on Education for Sustainable Development; Learn for our planet: act for sustainability. World Conference on Education for Sustainable Development, online, 2021. ED-2021/WS/17

1.3. PURPOSE AND OBJECTIVES OF THE COMPENDIUM

The TAP-TS LTPs Compendium serves as a comprehensive resource that supports educators in integrating sustainability concepts into their curricula. It follows these goals:

- ✓ It aims to cover the key design processes, and methodologies and present Frameworks that informed the design, development and evaluation process of LTPs.
- ✓ It presents an overview of a wide range of open and flexible teaching materials that cover various aspects of sustainability, designed for use



across primary, secondary, and higher education settings, and adaptable to various pedagogical approaches.

- ✓ It addresses the questions of equity and inclusion when it comes to designing materials for teaching sustainability.
- ✓ It provides recommendations for policy level, for institutional support to embed LTPs across curriculum, and for engaging local communities.



SECTION 2 DESIGNING FOR TEACHING SUSTAINABILITY

2.1 DESIGN PROCESS

Central to **the TAP-TS LTPs Design** is a model of professional learning that follows activity-oriented design contributing to collaborative knowledge building (Pischetola et al., 2023), and that is 'deeply reflective' and 'values-led' (Cavadas et al., 2023; Goodwin et al., 2023; Purdy et al., 2023). Below we consider the key characteristics of design process:



activity-oriented



Interdisciplinary



Participatory &
inclusive



Reflective &
iterative



values-led

Activity-Oriented Design: A key characteristic of the LTPs is their focus on activity-oriented learning as a mechanism for making knowledge actionable (Markauskaite & Goodyear, 2017) by translating learning to practice.

Interdisciplinary Holistic Design: In the LTPs design we aimed for that kind of teachers' professional development, where different theories and beliefs need to be articulated in order to seek shared epistemic grounds (Fischer et al., 2021). Therefore, we aimed to integrate knowledge and methods from multiple disciplines to provide a holistic learning experience, and address the complexity of sustainability issues, where challenges span environmental, social, economic, and cultural domains. The emphasis was on collaboration among partners whose interest lies in different knowledge areas to ensure the materials are both academically rigorous and practically relevant. Within TAP-TS, Interdisciplinarity is seen as profoundly important to achieve a holistic understanding and address complex sustainability issues. Holism implies that various dimensions and perspectives of sustainability are integrated in the LTPs. As suggested in the literature, interdisciplinary learning for sustainability is needed to enable students to look for relationships, interactions, and it becomes one of the key principles for the LTPs Architecture.

Participatory & inclusive design: Importantly, school leaders, teachers and student teachers as participants of TAP-TS Learning Events were seen as co-designers of LTPs and key experts of their practice. Through various modalities of participation, crafted through different types of workshop settings and collaborative work environments during the first years of TAP-TS, educators were able to engage in the design of teaching and learning materials that are responsive to diverse learner needs, context relevant, and pedagogically innovative. The iterative nature of this design work, facilitated by reflective practices, peer feedback and external evaluation, ensured that the TAP-TS materials evolved over time to align with emerging educational goals and technological advancements.

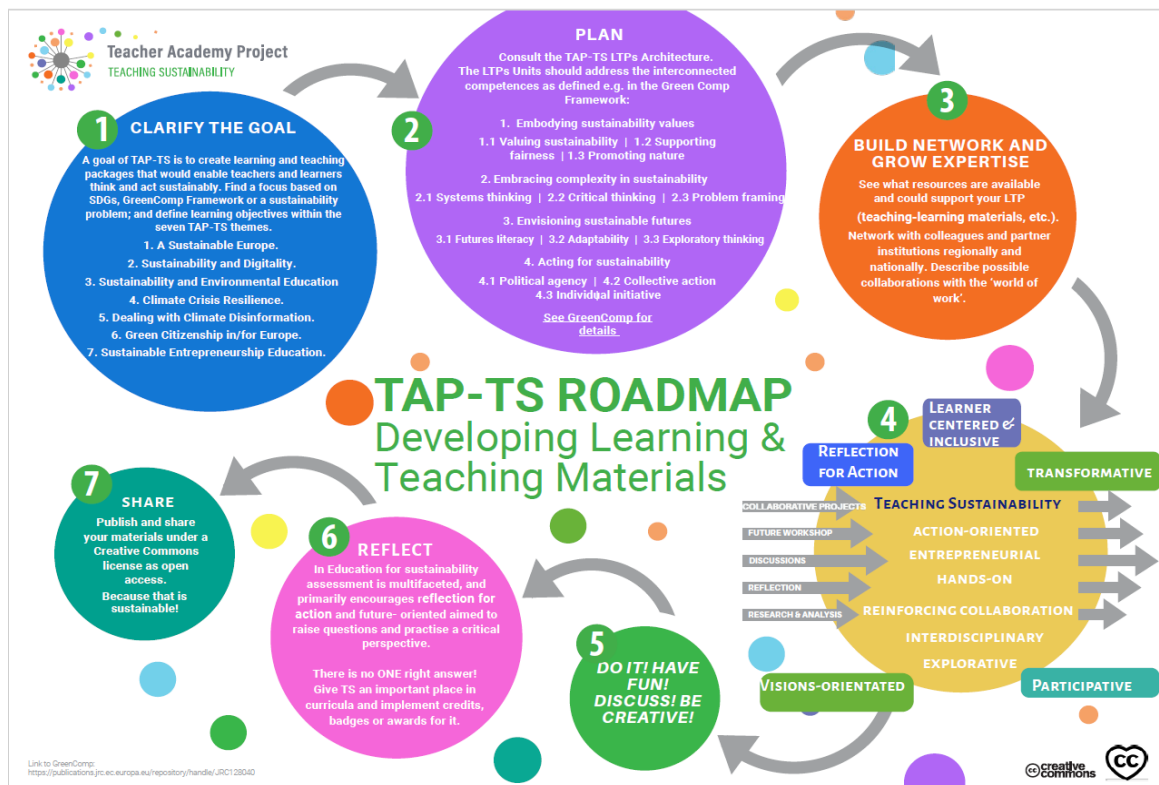
Values-Led: Values play a crucial role in designing teaching and learning materials for sustainability by guiding both content and pedagogical choices toward fostering environmental consciousness, social responsibility, and ethical decision-making.



Reflective & Iterative Design Principle: the LTPs development followed an iterative design process encompassing several key stages: collaborative development of common ground, key ideas, concepts, design of first drafts of modules; piloting and testing of those; making changes based on the feedback and evaluation; and validation of Fine Versions of LTPs. This cyclical process allowed for continuous improvement, ensuring that the final products were both practical and pedagogically sound.

2.2 LTPS ARCHITECTURE AND ROADMAP

The design process started with the development of an LTP architecture, along with a unique, [interdisciplinary Design Roadmap](#) (see [Appendix A](#)) based in the project specifications and the overarching purposes of the Erasmus+ TAP-TS Academy as devised originally by the lead-team at TU Dresden and UCD, Dublin. This was led by University College of Teacher Education, Vienna (PHW) and Technical University, Darmstadt (TU Darmstadt) who took on the role of guiding and assisting project colleagues in this initial and foundational work. The Roadmap is seen as a didactical guidebook and model with the steps to take for the LTPs development, and for teachers to use while developing materials for teaching sustainability. The Roadmap represents **seven flexible steps** (areas) for the production of LTPs, key principles for teaching sustainability and a number of pedagogical approaches for teaching sustainability. The work was informed by current research and practice in Education for Sustainability, and the EU GreenComp Framework GreenComp.



Picture 1. TAP-TS Design Roadmap



The principal challenge was to develop flexible ‘programmes’ that could be adopted by teachers and teacher educators with diverse experiences, backgrounds, and levels of prior knowledge, and that could be used in diverse contexts regardless of disciplines but with a focus on developing ‘sustainability’ values, interdisciplinary knowledge and understandings. These to include cognitive skills, key transferable skills, and practical interdisciplinary skills, linked to and going beyond the EU GreenComp Framework.



The LTPs are designed as incentives for educators to engage with various aspects of sustainability education, to be adapted and further developed by teachers in relation to their contexts of practice. Therefore, they are designed as flexible, adaptable resources.

2.3 SUSTAINABILITY COMPETENCE: GREENCOMP FRAMEWORK

Responding to the growing need for educators and learners to build sustainability competences, the European Commission published in 2022 a conceptual framework providing a common and flexible reference for the sustainability competence, GreenComp Framework (Bianchi et al., 2022; see [Appendix B](#)). The GreenComp is designed to guide understandings and practices for sustainability as a competence among learners of all ages and across all types and levels of education—formal, non-formal, and informal—along with their educators.

GreenComp puts forward a shared understanding and a definition of what sustainability as a competence should entail in a form that can be used in a wide variety of settings and by different individuals and organisations:


*“A **sustainability competence** empowers learners to embody sustainability values, and embrace complex systems, in order to take or request action that restores and maintains ecosystem health and enhances justice, generating visions for sustainable futures.”* Source: GreenComp statement on the definition of a sustainability competence (Bianchi et al., 2022)

GreenComp encompasses **four closely interrelated competence areas** and 12 competences for individuals to use as a reference framework.



Picture 2. GreenComp Framework: European Sustainability Competence Framework (GreenComp)

GreenComp offers a surprisingly adaptable framework to help specify the structure, content, and key competencies essential for fostering more sustainable thinking and action and so advance the sustainable development of society. A key attribute of the framework is that it is conceived as a “living document”, implying a dynamic and adaptable nature which allows for flexible adoption in diverse contexts (Bianchi et al., 2022).

 This has been one of the motivations for the project to adapt GreenComp as a central building block for project activities and outputs of TAP-TS. Its adaptability allowed the project partners to use the Framework as a **guidance document for co-designing the materials that foster sustainability competences, and developing a shared understanding of specific competences, knowledge areas and skills necessary to address sustainability challenges.** The competences included in GreenComp were used extensively during the initial design phase when the project partners discussed and decided about the content and activities of the LTPs units and project learning events. Furthermore, the specific ideals embedded in its four areas of attention were used in the development of the project self-assessment questionnaires and follow-up activities to construct the reflective approaches that we will discuss in the next section. Consequently, GreenComp has been fundamental to the nature of TAP-TS LTPs and by extension to its learning events and activities. LTPs were designed in such a way that they connect the abstract sustainability competencies defined in the GreenComp framework with challenging and yet practical classroom activities and resources. The picture below represents the use of GreenComp in LTPs at three levels:



Targeted GreenComp
Competences for the
Entire Units of LTPs



Objectives for
Activities: References
to GreenComp

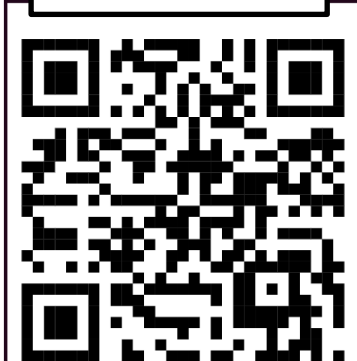


Informing Reflection
on Practice



To find out more about the GreenComp Framework, its rationale, development and foundations, watch or listen to the interview with the co-authors of the GreenComp, Guia Bianchi and Ulrike Pisiotis:

WATCH THE VIDEO



LISTEN



SECTION 3. METHODOLOGICAL UNDERPINNINGS

In this section we present the key methodological underpinnings behind designing activities for teaching sustainability.

3.1 PEDAGOGICAL APPROACHES AND PRINCIPLES

From the outset of TAP-TS, the partnership has found particular value in the comprehensive and accessible nature of the EU GreenComp Framework (Bianchi et al., 2022), and has been working towards choosing and developing those pedagogical approaches that could lead to the acquisition of the 12 competences described in the Framework. They are grounded in *the pedagogy of education for sustainability* and *pedagogical experimentation* on behalf of TAP-TS partners. Also, within the TAP-TS Partnership we had to reflect how sustainability concepts and values acquire meaning in teachers' everyday lives as professionals and as individuals; and how can we transform goals and content of education for sustainability to Teacher Education processes (in terms of content knowledge and pedagogical content knowledge)?

These questions were addressed with the help of the key principles suggested in the [TAP-TS Roadmap](#) (Step 4):



Picture 3. Methodological Underpinnings behind Designing for Teaching Sustainability Activities

interdisciplinarity, designed-in relevant, authenticity, hands-on emphasis, intrinsically valuable materials that nurture both learning and play while dealing with complex sustainability issues; emphasise on the need to raise awareness of sustainability challenges; the promotion of individual and collective action-oriented reflection; emphasis on the role of empathy in designing engaging learning experiences and increasing awareness of our human impacts on the environment and society; and wherever possible the fostering of collaboration, community and belonging in teaching sustainability. In essence, the approach resides within action-oriented, transformative pedagogy.

Action-Oriented, Transformative Pedagogy

Agency and action are fundamental concepts in EfS (Rieckmann, 2018). Transformative, action-oriented learning offers one possible approach to that end. It recognizes a need for “a fundamental shift—from learning how to understand learning how to act and transform” (Schnitzler, 2019, p. 243). Transformative or transformational teaching changes people by altering fundamentally the way learners understand themselves and others, the way they engage in and contribute to their larger world (ibid). Transformational teaching is about employing strategies that promote positive changes in students’ lives. The goal is not simply to impart certain information to students, but rather to change something about how students learn and live. It is about making lifelong changes. Key aspects of transformational teaching are **active learning, collaboration, and reflection**.

The key characteristics of the LTPs is their focus on **activity-based learning**, that is on creating tasks, situations, project work, activities, and other pedagogical ways to develop the related GreenComp competences and reach the set learning objectives. Following the constructivist philosophy—particularly the work of Piaget, Dewey, and Vygotsky—learning is an active process in which seeking knowledge is based on personal experiences and interactions with the environment. For the LTP activities, it was suggested to think in terms of different active learning pedagogies leading to a variety of learning and assessment approaches that could support the purposes / aims of the unit and which make use of the flexibility offered within the project at the different formats of TAP-TS Events.

Drawing on literature in EfS (e.g. Rieckmann, 2020), the **following pedagogical principles** inform LTPs:

- ✓ **Experiential learning, and inquiry-based learning** engage directly in hands-on, real-world problem-solving. Experiential learning immerses students in activities such as fieldwork, community projects, and simulations, allowing them to explore sustainable practices in real-life contexts. This approach encourages active engagement, reflection, and critical thinking, helping students understand the complexities of sustainability. Inquiry-based learning fosters curiosity by prompting students to ask questions, investigate environmental issues, and seek solutions through research and experimentation. By combining action with reflection, experiential and inquiry-based learning not only teach sustainability principles but also inspire students to develop the skills and mindsets needed for responsible, long-term environmental citizenship.



These approaches are a particular focus of LTP 2 Sustainability and Digitality, LTP 3 Environmental Education, LTP 6 Green Citizenship in/for Europe and LTP 7 Entrepreneurial Education.

- ✓ **Analysis of complex systems in particular including systems games** leverages game-based elements—such as challenges and interactive scenarios—to engage students actively in learning about sustainable practices. By transforming sustainability topics into interactive experiences,



serious games make complex issues like climate change and social responsibility more accessible and motivating.



LTP 4 Climate Crisis Resilience can be of particular interest in relation to this approach.

- ✓ **Learner-centeredness and accessibility** ensure that all students, regardless of background or ability, can engage meaningfully with the topic. A learner-centered approach tailors content to students' interests, prior knowledge, and learning preferences, fostering active participation and a personal connection to sustainability issues. That is the main reason we aimed to create the LTPs materials as flexible and adaptable as possible, meaning that they require further adaptations to local contexts, cultures, classrooms.



This principle is essential for all LTPs.

- ✓ **Action and reflection orientation** emphasizes learning through hands-on engagement and thoughtful consideration of one's actions. By combining direct action with structured reflection, this approach enables students to experience sustainability challenges first-hand—such as through projects on waste reduction, energy conservation, or community initiatives—while also taking time to analyse and understand the broader implications of their efforts. Reflection allows to critically evaluate the impact of their actions, fostering a deeper understanding of sustainability concepts and encouraging a mindset of continuous learning and improvement. This principle empowers students to become proactive change-makers, as they connect theory with practice, learn from their experiences, and develop the skills to apply sustainable thinking in real-world contexts.



This principle foregrounds All LTPs.

- ✓ **Participatory orientation** emphasizes involving students actively in the learning process, making them co-creators of knowledge. This approach fosters a deeper understanding of sustainability by engaging students in hands-on activities, collaborative problem-solving, and real-world projects that relate directly to environmental and social issues in their communities. Through participation, students develop critical thinking, communication, and teamwork skills that are essential for addressing complex sustainability challenges. By empowering students to contribute their perspectives, experiences, and solutions, participatory orientation cultivates a sense of ownership and responsibility, encouraging them to apply sustainable practices in their lives and inspiring them to be proactive agents of change for a more sustainable future.



Participatory orientation is the focus of LTP 6 Green Citizenship in/for Europe and LTP 7 Entrepreneurial Education.

- ✓ **Vision orientation** involves vision-building exercises such as future workshops, scenario analysis, utopian/dystopian story-telling. This



approach encourages students to think beyond current challenges and envision positive, achievable outcomes for the environment, society, and the economy. By focusing on a shared, forward-looking vision, educators can foster hope, motivation, and a sense of purpose among students, making sustainability feel both meaningful and attainable.



This approach is the focus of all LTPs, in particular LTP 2 Unit 4; LTP 1 A Sustainable Europe.

- ✓ **Whole-Institutional Approach** to teaching sustainability integrates sustainable practices across all aspects of an educational institution, including curriculum, operations, community engagement, and campus culture. Rather than limiting sustainability education to specific courses, this approach embeds sustainable values and actions into every part of the institution, from the way resources are managed to how staff and students interact with their environment. By involving everyone—students, teachers, staff, and the wider community—this approach creates a cohesive learning environment where sustainability is a lived experience, preparing students to apply sustainable practices in real-world contexts.



LTP 6 Green Citizenship in/for Europe looks at the approach in detail.

- ✓ **Critical and reflective thinking including discussions and reflective seminars** is a foundational principle in education for sustainability and teacher professional learning, as it empowers educators and students to analyze sustainability challenges from multiple perspectives, question assumptions, and consider the broader impact of their actions on the planet and society. Reflective thinking engages in critically evaluating one's own beliefs, decisions, and practices, allowing for continuous learning and adaptation.



This principle foregrounds All LTPs.

3.2 PREPARING FOR TEACHER PROFESSIONAL LEARNING

TAP-TS is informed by a research-based view of teacher professional learning as a process of social participation through belonging, being active and constructing identities in social communities (Wenger, 1998). Teachers have an active role in developing their own professional identity as their knowledge is a result of active and meaningful change. Clarke and Hollingsworth (2002) suggest that there are different pathways of change through four different domains, which encompass the teachers' world and play an important role in teacher learning: the Personal Domain, which refers to teachers' knowledge, beliefs, and attitudes; the External Domain, which refers to external sources of information or stimuli; the Domain of Practice which involves professional experimentation; and the Domain of Consequences which contains salient outcomes related to practice.

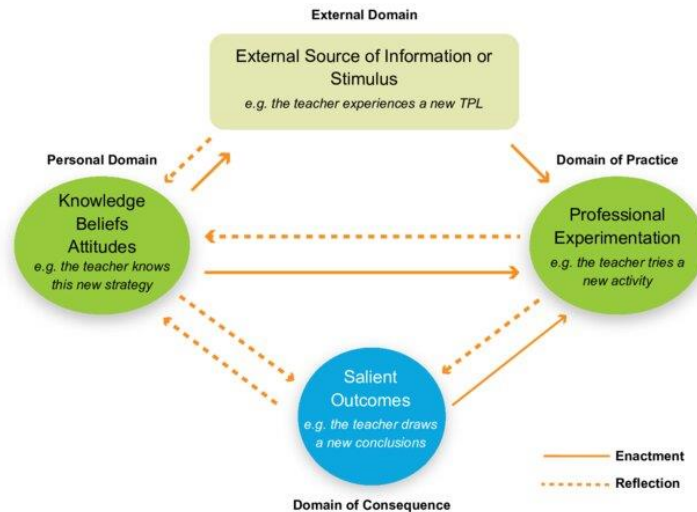


Figure 1. Clarke and Hollingsworth's (2002, p. 957) Interconnected Model of Professional Growth

Change in one of the domains is interpreted into a change in another domain through the mediating process of enactment, referring to what the teacher does as a result of knowledge, beliefs and experiences, and the mediating process of reflection, which refers to constructing and reconstructing experiences, actions, insights, problems and knowledge. Reflection refers to deliberate consideration of something previously encountered, while enactment is distinguished from mere “acting” in that it includes “the putting into action of a new idea or a new belief or a newly encountered practice” (Clarke & Hollingsworth, 2002, p. 953). A change in one domain leads to a change in another or to ongoing change in more than one domain, supported by inactive or reflective links. Clarke & Hollingsworth (2002) admit that some pathways may be more prevalent than others but what is important is the dynamic character of the model: different types of teacher change take a cyclical path of consideration and refinement through formal and informal interactions. Teacher learning adapts with the setting, considering external influences to integrate them and facilitate a responsive approach to individual needs. Teachers value and consequently attend to different things within a professional learning experience and inferences depend upon the value and belief system of the teacher. Teachers need time to develop, discuss and practice through learning activities that are systematic, sustained and intensive. Teachers’ professional learning is related to teacher’s professional autonomy and is both an individual endeavor, related to teachers’ active role, and a collaborative endeavor, that supports transformative practice and relates to teachers as a professional group (Clarke & Hollingsworth, 2002).

🎯 The TAP-TS policy on **teacher professional learning** follows this paradigm through a shift from teacher training and professional development, which are usually designed and implemented hierarchically, to professional learning, which focuses on **active learning and transformative practice** (Easton, 2008) and to providing opportunities for teachers’ professional learning in a systematic way. With TAP-TS Learning and Teaching Packages we aim to initiate change at each of the domains, starting with the development of materials that provide knowledge and experiences that reconstruct beliefs and actions. These are supported by structured reflection along a specially developed model for that (see [Section 3.3](#)).

3.3 MODELLING AND REFLECTING IN/FOR/ON INSTRUCTIONAL ACTIVITY

While the TAP-TS approach as a partnership to the core practices of reflection for professional learning has been avowedly heterogeneous and multidisciplinary, for the purpose of TAP-TS LTPs and learning events we borrowed heavily from Education for Sustainability articulation of reflection as **conversational and dialogical**. The aim of such reflection is not only to review experiences but to engage in a conversation with practice, with oneself and others. Within TAP-TS events and activities, this is done in a bounded, well-guided and ever-ambitious way. The emphasis is on working with experiences grounded in well-informed beliefs and expectations, and on appropriating or making these our own through a process of generative and dialogical negotiation. The TAP-TS Modelling & Reflecting on/for/in Instructional Activity (MaRIA) framework was assembled to guide and support the construction of the innate—or in the moment—and ex-post opportunities for reflection.

Essentially, **the MaRIA framework** was devised to meet a project need to help participants—teacher educators, in-service teachers and student teachers—as well as other educators interested in sustainability education, with orientations for reflection about the contribution of project pedagogical proposals to teaching sustainability and to so to the development of learners’ sustainability competences. As mentioned by Saari, Poulton-Busler, & Vladimirova (2024), sustainability education can start with teachers within their classroom teaching contexts but poses a broader challenge that must be addressed beyond the classroom walls, encompassing both a whole-school approach and purposive community engagement. **Critical discussions and reflective co-design of pedagogical experiences are essential to addressing that challenge can lead to more transformative environmental education** (Saari et al., 2024). Recognizing the relevance of this in the context of teacher education, the TAP-TS project put together the MaRIA framework, focusing teachers’ reflection on three increasing open levels of engagement in sustainability education: students, school, and the community. For each level, seven dimensions of reflection were envisaged:

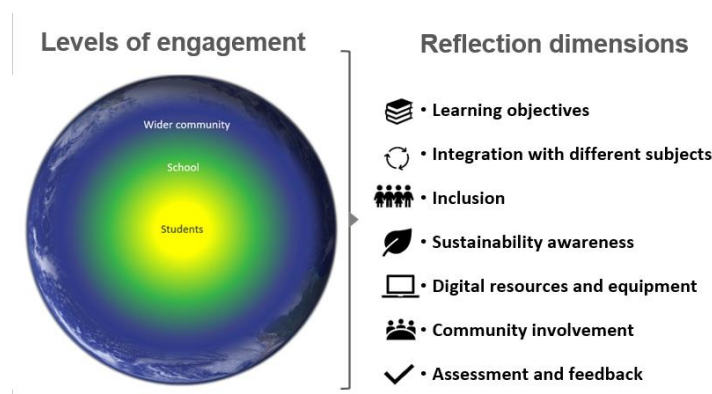


Figure 2. Levels of Engagement and Reflection Dimensions of MaRIA Framework

For LTPs Follow-Up Activities with the focus on reflection on teacher practice, we developed a set of prompts for each level of engagement and dimension (See examples of Prompts in [Appendix C](#)). With this we hope to build capacity for



appreciation of the world and its connectedness, as well as a sense of responsibility and agency toward sustaining community well-being. The process engages in reflection on uses of technology and TAP-TS activities and materials, but also around attitudes and possible actions, and aims to develop self-awareness, critical-thinking, collaborative and strategic competences (Rieckmann, 2018).

The reflective process in this case may, firstly, include reflective observation assisting students and teachers make meaning of the world around them and strengthen the process of understanding the complexities and interconnectedness of social and environmental systems; secondly, critical questioning that stimulates deep reflection, and help deeper understand the world around us with all its complexity, and what tools and activities can assist in this; and, thirdly, questions that invite to act rather than react to build a collective capacity necessary to be able to meet sustainability challenges.

In TAP-TS learning experiences, such reflective processes may follow collaborative real-world (school and community related) projects, vision-building exercises, stakeholder analysis, modelling games, community-based research etc, also inviting individual and collection action. Importantly, opportunities for reflection are deliberately structured to be generative and the learning experiences themselves are thought of as collaborative, co-designing processes which foster participatory learning and critical thinking, and thus motivate and enhance ability to take part in making a positive contribution to the community, and the planet.

SECTION 4. LEARNING & TEACHING PACKAGES

4.1 THEMES OF LEARNING & TEACHING PACKAGES



The TAP-TS Learning and Teaching Packages (further LTPs) are Learning and Teaching Programmes that include sets of open and flexible learning & teacher materials, co-developed and validated by the TAP-TS Partnership. Firstly, the LTPs are planned as formalised modules that can be taken and freely adopted / adapted by teacher education institutions across the European Union. Secondly, they include materials and resources for teachers to directly implement in their classrooms, with needed adaptations. The core purpose of the LTPs is to motivate, build confidence, and provide teacher educators, teachers, and student teachers with high-quality, materials, ideas, and other practical support on educating for a greener, more sustainable Europe. These materials have formed the foundations for the TAP-TS Academy activity over the life of the project.



The LTPs encompass seven interdisciplinary themes in relation to sustainability:



Picture 4. Screenshot of the LTP presence on TAP-TS Platform

LTP 1. A Sustainable Europe provides introductory activities for addressing sustainability within secondary education and teacher education. Key themes include: exploring local and global sustainability challenges and possible solutions; tackling discrimination in education, and enabling multilingual education for more fair and sustainable futures.

LTP 2. Digitality and Sustainability is meant for primary (teaching students from 6 to 12 y.o.) pre-and in-service teachers, and focuses on the relationship between digitality and sustainability. It brings interdisciplinary perspective, and engages teachers and students in reflection of their own role, creation, inquiry and raising questions and ideas for the future.

LTP 3. Sustainability and Environmental Education is mean for primary (teaching students from 6 to 12 y.o.) pre-and in-service teachers, and apart from introducing to the importance of environmental education and sustainability, it engages in actions for environmental sustainability.

LTP4 Climate Crisis Resilience is designed to encourage and support teachers and teacher students to use serous games in their teaching relating to climate crisis



resilience and other aspects of sustainability. It is structured so that it can be completed either in-person as part of a seminar/workshop or at-distance in the form of a fully online learning event.

LTP5. Climate Disinformation provides first a theoretical background on the Media Landscapes, concept of disinformation and related concepts; draws on a number of case-studies, and asks teachers to develop the materials/examples and invites to assess and reflect on the scale of the problem of disinformation locally.

LTP6. Green Citizenship in/for Europe introduces whole-school approach to sensitize the school community to resource saving and taking responsibility through a number of activities and projects.

LTP7 Sustainable Entrepreneurship Education focuses on the promotion of entrepreneurial competences within the framework of project-based learning/design thinking and under the reflective guidance of the teachers and brings the materials and activities under the thematic ensemble City of the Future.


The themes are not accidental, and aim to address the most pressing issues related to teaching sustainability and happenings around the globe that should be important for teachers, children, parents. The decision around the themes has been the result of collaborative work within the TAP-TS Partnership.

4.2 OBJECTIVES & STRUCTURE OF LTPS

All LTPs are seen as **stand-alone**, begin with an introduction unit, and include units that are connected but not dependent on each other so that one could choose a unit not necessarily having done the previous one.

LTPs include activities that

- address the interconnected competences as defined e.g. in the Green Comp Framework
- include networking with colleagues and partner institutions regionally and nationally.
- engage with values-oriented, action-oriented, learner-centered and entrepreneurial pedagogies
- are hands-on and speaking to today's challenges
- reinforce collaboration
- engage teachers in articulating, sharing and reflecting upon their current understandings and practices in relation to the topic of the LTP
- engage teachers in critically exploring rationale for the topic in relation to education for sustainability
- engage teachers in critically considering research-based insights in relation to the topic
- engage teachers in co-creation of materials and reflection on example activities in relation to their practice, learners and professional contexts
- provide guidance in relation to assessment that primarily encourage reflection, action and future orientation
- aim to raise questions and practise a critical perspective.

 LTP materials are designed to be accessible to diverse participants.

In general terms, **LTPs Architecture** follows a rather simple line. Each LTP consists of connected Units with a particular content focus, activities description for teachers (student teachers) and students, resources and support materials, curriculum connection, reference to GreenComp competence area(s), and suggested assessment.


Each unit has the structure of Start-Up, Development, Consolidation and Follow-Up activities.

Start-Up Activities: These are the initial activities that introduce the topic, activate prior knowledge, and set the stage for learning. They often include warm-ups, brainstorming, or discussions that spark curiosity and establish context.

Development Activities: These core activities build on the introduction by providing deeper exploration of the topic.

Consolidation Activities: These activities are designed to reinforce solidify learning. They include activities that help connect ideas, clarify any confusion, and apply concepts in meaningful ways.

Follow-Up Activities extend learning beyond the classroom. They include projects, discussions that encourage to apply what they've learned in new contexts, reflect on their growth, or explore further related topics.

 Some LTPs also have digital sample Moodle Courses which are not moderated but can be used as an inspiration to start an online course. These have been piloted within the TAP-TS events, edited and are stored on the related LTP page on [the TAP-TS Platform](#).

4.3 LTPS: ECTS CREDITS

The higher education learning landscape is changing with the rapid development of more diversified and flexible learning opportunities. To recognize teacher professional learning within TAP-TS and to support an integration of LTPs into teacher education curriculum, the partnership paid specific attention to recognising what the learners have learnt and achieved applying the principles of credit allocation. ECTS credits are allocated for each LTP based on the workload needed to achieve the defined learning outcomes, as described in [the ECTS users' guide](#).

As an alternative, there is an impressive work done by EduSTA Teacher Academy in [developing competence-based digital badges](#) for four specified Education for Sustainability competence areas. These are Sustainability Literacy, Learning Ecosystem Design, Enabling Action and Reflexive Praxis Competence. Each of these competence areas consists of one or more micro badges. These can be linked to GreenComp Framework Competences that are targeted in LTPs Units, and used for assessment of competence development in a new and flexible way. It should be noted that this method has not been piloted within TAP-TS.



4.4. INTRODUCING LTPS

The table below represents a brief description of each LTP, their Units, target group, the main approach to introduce each theme, authors of LTPs, and suggested ECTS credits for each LTP. More detailed overviews of LTPs can be found in [Appendix D](#).

The Overviews were translated into partner languages, and available in English, German, Greek and Portuguese. Where time and resource allowed translations of LTP overviews were produced and reviewed by native speakers. In other cases, artificial intelligence (AI) was used. The translations are available on the related LTPs pages on the [TAP-TS Platform](#).

Table 1. Overview of LTPs

LTP Title Authors	Key Focus	Approach to the Theme	ECTS credits
<p>LTP 1. A Sustainable Europe: Content, Competencies & Approaches for Secondary School Teachers</p> <p>Link - https://tap-ts.eu/course/index.php?categoryid=10</p> <p>TU Dresden Rachel Bowden Denise Hornig, Katrin Lange, Ulrike Lange</p> <p>UCD Conor Galvin Katelyn Stainforth</p>	<p>This introductory LTP provides secondary-level teachers and teacher educators with a foundation in education for sustainability in European schools.</p> <p>Unit 1. ‘Sustainability and me’, engages learners to consider what sustainability and sustainability education mean to them in European and international discourses.</p> <p>Unit 2. “Envisioning a Sustainable Europe” invites participants to imagine the European Union (EU) as a sustainable society while diving deep into the current risks towards a sustainable EU and opportunities that are being taken to contribute to one.</p> <p>Unit 3. ‘Education for Sustainable Futures’ engages educators to critically consider the potential of education to support the transition to more just and sustainable futures.</p> <p>Unit 4. Multilingual Education and Sustainability explores the relationship between multilingual education and sustainability</p>	<p>This LTP includes a range of game-based, discussion and reflective activities for engaging secondary level educators and students with sustainability, sustainability education and the question of a sustainable Europe, in theory and in practice.</p>	<p>ECTS Credits: 2</p>
<p>LTP 2. Sustainability & Digitality: Content, Competencies &</p>	<p>The LTP introduces four units around the relationship between digitality and sustainability.</p>	<p>The LTP offers pedagogical materials, invites hands-on</p>	<p>ECTS Credits: 1.5</p>



<p>Approaches for Primary and Lower Secondary School Teachers (teaching 6-12 y.o.)</p> <p>Link - https://taps.eu/course/index.php?categoryid=11</p> <p>TU Darmstadt: Nina Grünberger Judith Neuthard</p> <p>University College of Teacher Education, Vienna: Florian Danhel Martin Sankofi Petra Szucsich Elena Revyakina Klaus Himpsl-Gutermann</p>	<p>Knowledge and pedagogical materials on topics such as harmful effects of digital technologies on the environment, the importance of digital technologies to deal with the climate crisis, and the social inequalities and social dependencies arising from digital infrastructures are addressed.</p> <p>Unit 1. Introduction to Sustainability and Digitality introduces basic knowledge about the relationship between digitality and sustainability. The aim is to understand which ecological, economic and social challenges the digital world poses from a global perspective.</p> <p>Unit 2. My Smartphone Planet Earth and ME invites to look at the complex relationship through the technology we use on everyday basis. The focus is first on the phone, then on the whole world and finally on one's use of technology.</p> <p>Unit 3 The Digital Technology Network on the Globe deals with the complex interactions of digitalisation from a global perspective. In this unit, various physical and digital world maps are used to illustrate the global impact on natural resources. Participants explore where undersea cables run and learn about the concepts of the ecological footprint and handprint. The growing amount of electronic waste is also used to address the global imbalance brought about by the digital transformation.</p> <p>Unit 4. With or Without Technology? has a clear focus on questions about the future. The focus is on raising ideas, questions, concepts, etc. oriented towards existing theories on developments in the IT sector.</p>	<p>projects, networking with school partners and NGOs, and engages in reflection.</p>	
<p>LTP 3. Sustainability and Environmental Education: Content, Competencies &</p>	<p>This LTP approaches the relation between environmental education and sustainability. The LTP is organised in four units</p>	<p>Different educational resources are used to develop content knowledge and</p>	<p>ECTS Credits: 1.5</p>



<p>Approaches for Primary School Teachers (teaching 6-12 y.o.) Link - https://tap-ts.eu/course/index.php?categoryid=12</p> <p>Politécnico de Santarém, Portugal:</p> <p>Bento Cavadas Susana Colaco Neusa Branco Elisabete Linhares</p>	<p>structured in a common theme: One Earth. Each unit approaches one sustainable development goal (SDG).</p> <p>Unit 1. Introduction to Sustainability and Environmental Education is an introduction to sustainability and environmental education.</p> <p>Unit 2. My actions to protect biodiversity focuses on the SDG 15 Life on Land. The SDG 15 main purposes are to protect, restore, and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.</p> <p>Unit 3. My actions to protect water brings into focus understandings about water being part of complex global interrelationships and systems.</p> <p>Unit 4 My actions to save energy aims to improve students' understanding of the concept of energy, the distinction between non-renewable energy resources and renewable energy resources. The objective is to better understand how small individual choices for a more sustainable lifestyle can have an impact on saving energy and contribute to the adoption of energy-saving behaviours.</p>	<p>pedagogical content knowledge about actions to protect biodiversity and water, actions for sustainable consumption and actions for energy consumption reduction. The LTP is focused on hands-on and digital educational resources for the development of primary school students' sustainability competences.</p>	
<p>LTP 4. Climate Crisis Resilience: Content, Competencies & Approaches for Secondary School Teachers Link - https://tap-ts.eu/course/index.php?categoryid=13</p> <p>Eummena: Arjana Blazic Bart Verswijvel</p> <p>University College Dublin: Conor Galvin Katelyn Stainforth</p>	<p>This LTP focuses on teaching about the climate crisis and developing resilience through educational games. It centres on providing better understanding of the climate crisis and resilience on a personal and collective level.</p> <p>Unit 1. Using Serious Games to Teach Sustainability and Resilience is an introduction on how gamification can enhance teaching and learning about the climate crisis and about becoming resilient.</p> <p>Unit 2. Stop Disasters Game introduces digital game-style elements in which an online</p>	<p>This LTP focuses on teaching for understanding of the climate crisis, resilience on a personal and collective level. It works predominantly through educational games, both digital and analogue.</p>	<p>ECTS Credits: 2.5</p>



	<p>platform is used to teach disaster risks and resilience.</p> <p>Unit 3. Teaching Sustainability with Scenario-Based Learning uses the framework of a scenario with the students engaging in role play. The main narrative behind this activity is the possible building of a holiday resort on an island with a small population and well-preserved nature.</p> <p>Unit 4. Design Board Games is focused on the design of a board game centred around climate crisis resilience. Through a gamified approach, this unit aims to equip learners with practical skills and knowledge to critically address challenges posed by the climate crisis in their local community or in a setting they know well or can easily relate to and to think about creative ways to solve these challenges.</p>		
<p>LTP 5. Navigating Climate Information and Disinformation: Content, Competencies & Approaches for Secondary School Teachers.</p> <p>Link - https://tap-ts.eu/course/index.php?categoryid=14</p> <p>University College Dublin: Conor Galvin Rachel Farrell Niall Brady Katelyn Stainforth</p> <p>Kings Hospital School Jerome Devitt</p>	<p>This LTP introduces the skills and understandings needed to work with climate information and disinformation.</p> <p>Unit 1: Information & Disinformation. Understanding the nature of information / disinformation and its different forms.</p> <p>Unit 2. Distinguishing Disinformation from Misinformation. An exploration of the challenges to climate solutions presented by inaccurate information and certain media activity.</p> <p>Unit 3. The Dangers of Disinformation. Guidance on structuring and teaching the knowledge that students require to identify the dangers of disinformation – and how to deal with it.</p> <p>Unit 4. What we can do to challenge Climate Disinformation. Developing critical understanding of bad information practices and moving learners towards an activism-</p>	<p>The LTP provides knowledge and critical pedagogical approaches to work with secondary school students on finding and recognising valid information and spotting disinformation relating to climate and sustainability.</p> <p>It promotes skills to analyse the origins of bad information, and to manage learning that engages these.</p> <p>Within the LTP students learn to use their critical thinking skills to move towards an activism-based approach.</p>	<p>ECTS Credits: 2.5</p>



	based approach to countering and mitigating inaccurate climate information.		
<p>LTP 6. Green Citizenship in/for Europe: Content, Competencies & Approaches for Schools Link - https://taps.eu/course/index.php?categoryid=15</p> <p>Friedrich-Schiller-Gymnasium Pirna, Germany</p> <p>Jan Kvapil Christian Raum Antje Walther Franziska Hanicke</p> <p>With support of Elena Revyakina (PHW) Eszter Csepe-Bannert (CORedu) Rachel Bowden (TUD) Katrin Günther (TUD)</p>	<p>The LTP invites teacher educators, school leaders and schoolteachers to embed learning and teaching for sustainability across the institution using Whole School Approach. The LTP Units introduce ways to connect what students learn through their curriculum with what is practised in the school by giving concrete examples of a secondary school.</p> <p>Unit 1 Introduction to Whole School Approach and Green Citizenship Education is understood as an introduction to the topic of Whole School Approach to sustainability and Green Citizenship. It also engages with the individual project phases and teaches to apply these in daily practice in order to set the process of 'sustainability' and 'education for sustainable development' in motion at their school / institution.</p> <p>Unit 2. Mosaic Game aims to engage with the idea that it takes the whole school community to work together towards improvements. Mosaic Game serves as an innovative teaching and learning tool to support WSA for sustainability by fostering collaboration and critical thinking among students and staff.</p> <p>Unit 3. 'Places Of Learning And Resources' (POLAR) for sustainability' engages with the pedagogical possibilities of POLAR, outside of schools, for sustainability education. The unit is aimed at secondary level teachers and student teachers from across subjects, and works particularly well in interdisciplinary groups.</p>	The LTP introduces knowledge and examples of practices to establish a culture of sustainability in a school.	ECTS Credits: 1.5
<p>LTP 7. Sustainable Entrepreneurship Education: Content, Competencies & Approaches for</p>	The LTP Units aim to promote and develop entrepreneurial competences such as "creativity, vision, valuing ideas, ethical and sustainable thinking, self-awareness, motivation,	The LTP focuses on the promotion of entrepreneurial competences within the framework of project-based learning/design	ECTS Credits: 2



<p>Secondary School Teachers Link - https://tap-ts.eu/course/index.php?categoryid=16 CORedu: Eszter Csepe-Bannert</p>	<p>mobilising resources, taking initiative, learning through experience" embedded in the thematic complex "City of the Future". Unit 1. Introduction to Sustainable Entrepreneurship Education provides knowledge-basis around entrepreneurship and sustainability competences supported by focusing questions. The aim of Unit 2 is self-reflection on values and attitudes towards sustainability and entrepreneurship. Unit 3 Transfer supports teachers by the transfer of their know-how, values, attitudes, and motivation into the teaching practice. In Unit 4 Implement the participants develop their own teaching and learning materials by aligning the learning objectives of their subject(s) with the sustainable entrepreneurship competencies. Furthermore, the participants also elaborate hands on working materials for students and set the assessment methods and tools for the assessment of the learning outcomes with examples provided. Unit 5 City of Future is more practice-based, and would be of interest for student teachers and teachers to implement directly in the classroom. It aims to inspire to develop sustainable entrepreneurship competences among students in an engaging and fun way, while at the same time giving knowledge-basis around key concepts. Students will set on a journey to improve their local surroundings by critically exploring what could be improved and how in their own cities or towns.</p>	<p>thinking and under the reflective guidance of the teachers.</p>	
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SECTION 5. EVALUATION FRAMEWORK

The approach in the learning evaluation aims mainly to follow the project and engage project partners in articulating the desired impact and outcomes of the project, ensuring that the project's efforts, activities, and results lead to these, even if it requires adjusting the original plans. In addition to describing and evaluating the project's results and effects, the Evaluation Team, KREducation, are responsible for guiding whether the activities and goals are meaningful and realistic. The evaluation team also have a role in contributing to the project's learning and supporting decision-making. The evaluative perspective involves using the participants' lessons and experiences from the work carried out, such as development, piloting and validation of LTPs. The key processes within the evaluation perspective are gathering, processing, analyzing, evaluating, and identifying trends in the information. In relation to LTPs, the following evaluation tools have been used:

- **Participant Observation:** Through observation, it is possible to perceive nuances in the activities and their function. Observation also serves as a basis for other evaluation efforts directed at participants and staff. This enables a shared reference framework between the project and the evaluator. Observations are often used for discussion questions in focus groups and individual interviews. This gives the evaluator a fundamental understanding of the project, its activities, and the nuances related to information provided through documents, staff, and participants. Participant observations have mostly occurred in connection with training events (e.g., online courses, active learning events, and summer school) but also during preparatory and follow-up work.
- **Focus Groups:** focus groups discuss overall structures, trends, activities, and approaches. The information in focus groups often has a broader character, making it generalizable.
- **Individual Interviews:** Individual interviews are a tool that allows the evaluator to gain more specific knowledge in contrast to the broader knowledge provided by the methods above. Individual interviews are a good way to complement and deepen the knowledge that has emerged in previous evaluation efforts. Through individual interviews, project experience can be examined on a more personal level, adding nuance to the information that may emerge in focus groups. Individual interviews are also an important tool for obtaining information about the nature of the target group. Since individual interviews offer more personal contact between participants and evaluators, discussions about personal circumstances that can affect the project process often arise. In this way, the evaluation contributes to a learning process about the target group itself, which is essential for the project's method development. Semi-structured interview forms are used in individual interviews to allow for follow-up questions without controlling the



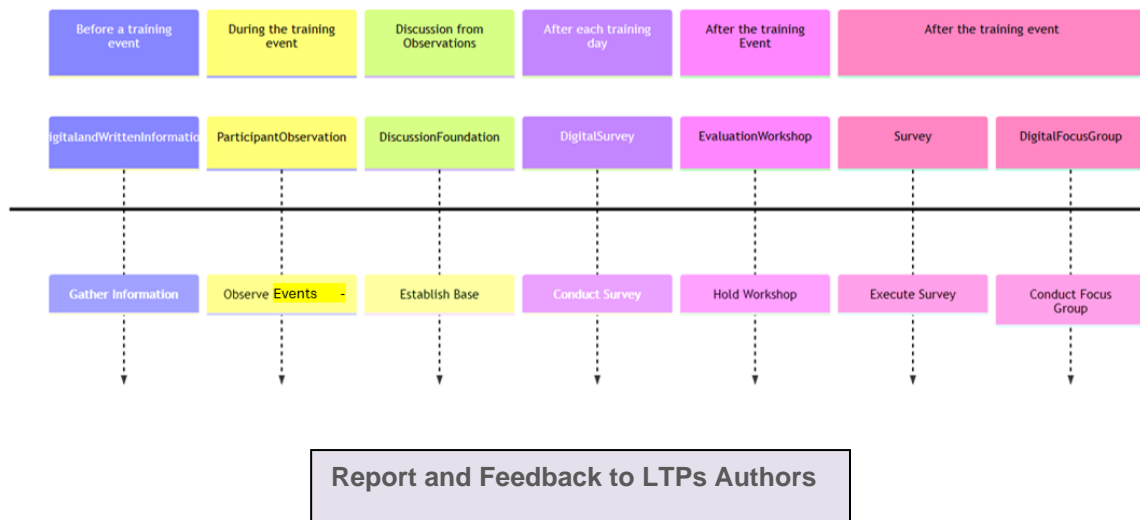
information provided by the interviewees. Individual interviews occurred in connection with or during the follow-up of LTPs.

- **Surveys:** To complement the qualitative data collection methods, various forms of surveys can be used to collect quantitative data. One way to identify common evaluation criteria is with inspiration from EPIC, an evaluation tool connected to entrepreneurial competencies, and GreenComp, the central component in this work. KREducation team have developed a general survey template that was applied to all learning events where the focus was on aspects and competencies from GreenComp.

The most common approach to gathering information in TAP-TS around LTPs has been as follows:

1. Before a training event – Participating in the meeting, reading the material, and taking part in all oral and written information that forms the basis for the training event.
2. Participant Observation during the training event – This becomes first-hand information by forming an impression of the activities conducted within the framework of the project during the training event. This enables an increased understanding of the activities carried out and the possibility of documenting them from different perspectives. As an external observer, the evaluator can understand the function of the activities based on the project's ambitions.
3. Discussion Foundation from Observations – Observations are used as a foundation for discussion questions in focus groups, workshops, and individual interviews in connection with the training event and the digital follow-up focus groups.
4. Digital Survey after each training day – A digital survey is conducted after each training day based on the day's content.
5. Evaluation Workshop – After each training event, an evaluation workshop is held to gather participants' thoughts, engagement, and what they have taken from the training.
6. Survey after the training event – One week after the training event, a survey inspired by EPIC and GreenComp is distributed. The focus is on aspects and competencies from GreenComp.
7. Digital Focus Group after the training event – Two to three weeks after the training event, all participants are invited to a digital focus group to discuss what they have taken from the training and applied to their organizations.

Figure 3. Stages of Evaluation of LTPs



The Project Advisory Group (PAG)

Alongside this, TAP-TS also has the PAG, which can briefly be described as our critical friends. The PAG was charged with ensuring that project activities, deliverables and outputs met the requirements of a project on this scale and ambition, while remaining disengaged from its direct work and day-to-day activities. Essentially, offering supportive yet challenging feedback on the nature and detail of project resources, activities and plans. The Group includes experts in the fields of Education for Sustainability, learning design and implementation, monitoring and assessment, and general didactics. The composition of the PAG shifted as the project progressed but the group has consistently played an invaluable role in guiding and informing our work, beyond the initial phase. In particular, valuable guidance has been given in terms of the pedagogy of sustainability with PAG members—individually and collectively—offering suggestions and even specific examples of how TAP-TS resources could be better integrated into existing European curricula/ assessment frameworks, and on approaches to engaging participants in considering their own community contexts and using this as a starting point for accessing the global issues. While largely unfamiliar initially with the GreenComp framework, the TAP-TS PAG came quickly to see its affordances and consequently were in a position to offer timely advice on addressing GreenComp comprehensively and clearly in the revised, post-pilot LTPs—as well as on further enhancing the quality and teacher/student friendliness of LTP materials and how these were deployed and used in the second round of project learning events. It no small part due to PAG guidance, there are also much improved links built into TAP-TS LTPs to a greater range of age-specific teaching and learning resources, and that the materials deal with complex challenges and issues in a well thought-out and ethical way.



SECTION 6. SOME EXAMPLES OF LTP USE BY PARTICIPANTS

Some examples of where and how the LTP content has been applied:

In the final six months of the project evaluation, there have been follow-ups with participants on how the implementation of LTP content has been used and in what ways. Some examples have emerged of how TAP-TS LTP content has been applied across Europe. More detailed information will be presented via TAP-TS Community, however here we present a few cases.

The first example comes from a participant working in a primary school **in Romania**, who used **LTP3 Sustainability and Environmental Education, specifically Activities 2 and 3 in Unit 2**. This participant utilized the preparation instructions from Unit 2 when conducting BIOCUBES with students. The reason for using Biocube was that the participant teaches biodiversity, nature, and biology. The participants followed the instructions for Activities 2 and 3, choosing this specific LTP and unit because they wanted the students to gain the knowledge and experience that they had felt during the course. Additionally, at this school in Romania, they have a week each year dedicated to sustainability, where the entire week focuses on this theme.

Another example comes from a participant in **Portugal** who used **LTP 4 Climate Crisis Resilience, Unit 3, Serious Game**, which was highly appreciated by the students. The students later reported feeling that they learned much more about different environmental and sustainability scenarios through this method compared to the traditional approach.

A third example involves a participant from **Cyprus** who introduced the courses to their colleagues. The school staff had a development day where they worked with some of the material, especially **LTP3 Environmental Education Unit 3, due to their water scarcity issues**. The participants also conducted an activity with water and rain, which tied into their low rainfall challenges. During this development day, **LTP 2 Sustainability and Digitality, Unit 2 My Smartphone. Planet Earth and Me** was also introduced. Teachers reflected positively on what they experienced, and the next step is to determine how to share this work with students, as the principal wants the students to take action.

These are three examples, but there are more which is part of the Evaluation Process and will be presented in the Evaluation Reports and via TAP-TS Community.

SECTION 7. RECOMMENDATIONS

The co-design and testing of innovative approaches and content to support the development of sustainability pedagogical competences of pre- and in-service teachers has involved close collaborative working between teacher education institutions, professional development institutions, secondary and primary schools, civic organisations and with school teachers and student teachers. Here, we present key learning points from the iterative process of co-design and testing of LTPs, and this collaboration, at three levels:

6.1 POLICY LEVEL

A key aspect of the remit of TAP-TS as an Erasmus+ Teacher Academy is to help inform policy and policy making in our areas of attention. Based on the experiences of designing, developing and refining the TAP-TS *Learning & Teaching Packages*, we would put forward a number of suggestions for the European Commission to consider regarding the value of policy that supports and encourages the development and implementation of LTP-type, sustainability-focused resources as meaningful curriculum action and a powerful approach to teacher development:

- **Promoting co-design and co-authoring opportunities for Educators can enhance engagement and confirm the relevance of Sustainability Education.** Encourage policies that empower teachers, school leaders, and other educators to act as co-designers and co-authors of sustainability-focused teaching resources like LTPs, involves educators directly in the development process which not only increases the relevance and contextual appropriateness of the materials but also fosters a sense of ownership and engagement. By supporting educator-led design initiatives, the European Commission can help ensure that the resulting learning and teaching materials and resources – such as our LTPs – are responsive to classroom needs, culturally sensitive, and adaptable to diverse educational contexts. This participatory approach also enhances educators' professional development, equipping participants with practical, values-based capacities to inspire sustainable thinking and action among students and other learners.
- **Systematically building opportunities for generative reflective and deliberative learning on the teacher's part into LTP-type resources offers a powerful and intuitive path towards teacher learning.** The value of providing these opportunities has been a major learning point relating to the TAP-TS LTPs. Supporting policy frameworks that promote such practices and support teachers to introduce them into their teaching could help greatly in shaping iterative, values-driven teaching for sustainability – particularly in the way they encourage feedback loops and iterative adaptations of LTPs based on classroom experiences. By fostering a culture of ongoing



improvement through such reflection and coupling this with support for peer review and appropriate institutional backing, the European Commission can help ensure that the learning pathways associated with devising and using LTP-type resources remain aligned with evolving sustainability competencies and pedagogical advancements, so helping teachers and other educators build confidence and adapt teaching methods to meet future sustainability challenges.

- **Encouraging institutional and community partnerships to embed learning for sustainability in local educational contexts proved challenging but rewarding for the development and use of TAP-TS LTPs.** Sustainability education must reach beyond the walls and grounds of the school. Facilitating policies that encourage schools and teacher education institutions to work closely with local communities and stakeholders to contextualize and integrate sustainability education and practices resources is likely to prove popular and effective. By fostering such participatory, community-oriented learning environments and activities our project LTPs were better placed to address local sustainability needs, encouraging learners to act for sustainability and build connections with community sustainability efforts and programmes. This aligns with TAP-TS broader sustainability goals by making the work we undertook in and through the LTPs relevant to local challenges and so more open to fostering deeper meaning and impact in sustainability education.
- **Supporting interdisciplinary and inter-sectoral teacher education for sustainability has been a hallmark of the TAP-TS project and is embedded at a foundational level into the project LTPs.** TAP-TS LTPs were designed and developed in collaborations by partners from across the range of project interests and backgrounds – teacher educators, teachers in our partner schools, civil society activists, and online education specialists. This resulted in forms of teacher professional development and learning which focus more on capability, confidence, and new approaches, facilitating recognition for learners' effort, and working to ensure that schools are encouraged to build on the idea of sustainability education as *place-based*; that is, in context and in association with the wider community, and for action on sustainability in the broader sense. Promoting policy on funding and resource generation for teacher education institutions to adopt and adapt the interdisciplinary, values-led pedagogies and learning processes required for transformative learning and necessary for a green transition would greatly advance this agenda. Similarly, policies that support in-service teachers and other educators from non-formal sectors who are engaging with sustainability education could greatly expand the range of high-quality LTP-type materials and resources available for in-career / learning and professional



development.

Work on TAP-TS LTPs has shown that emphasizing flexible and collaborative design, such as TAP-TS's approach, allows the emergence of new pedagogical thinking that provided a valuable basis to engage with the complex issues and relationships associated with sustainability. Our LTPs have fostered partners' deeper understanding of sustainability's complex, interconnected nature and its educative possibilities. This echoes the EU *GreenComp* Framework, enabling educators to integrate environmental, social, and economic perspectives into diverse teaching contexts and helps empowering teachers to implement meaningful, learner- and learning-centred praxis in their classrooms – a key focus for the TAP-TS project.

6.2 INSTITUTIONAL SUPPORT

Sustainability curriculum in teacher education is a crucial lever for building capabilities and knowledge for (prospective) teachers to address the interconnected social, ecological and economic challenges of the 21st century in their professional, and personal lives. In terms of Education for Sustainability, teachers and educators should aim to help their students develop environmental and ethical awareness, values and attitudes, skills and behaviour consistent with sustainable development for the future benefit of our society. Therefore:

- **There is a need for a more strategic and coordinated framework guiding the use of education and learning, to embed systemic change within the institutions.** Embedding sustainability concepts across all courses, not just environmental science, encouraging interdisciplinary projects and courses that blend multiple subjects to show the interconnected nature of sustainability issues is part of the process. Whole-Institutional Approach is one way to start change. Also, most activities suggested in LTPs provide a bridge between science and the humanities.
- **Offer flexible frameworks and content options to enable integration within existing teaching, term dates and local assessment, overcoming the constraints of university new course quality accreditation approval.** Selecting 'parts' of the LTPs to incorporate within existing courses can be a better and easier option than taking full LTPs with the suggested ECTS Credits. To recognize learning, alternatives like digital badges connected to GreenCompFramework could be used.
- **Sustainability competences should be embedded in courses, assessed and accredited.** Such a move, supported by management, is likely to be a catalyst for other innovations, such as changes in teaching approaches, collaboration, all supported by resources from projects and competence frameworks.



- **Create innovative learning environments, communities of practice within the TE institutions**, to encourage collaboration, experimentation and opportunities to practise sustainability competences supporting both teacher educators and student teachers.
- **Intensify efforts to develop educators' and student teachers' sustainability competences by building closer links with local networks of schools.** While HEIs can provide education in valuable pedagogical guidance and mindset, it is when these are adequately and appropriately combined within the live context of a school that innovative practice can be embedded.

6.3 TEACHER PRACTICE LEVEL

There are many ways that the LTPs materials can be used in education, depending on the context, and on the educator's and student's interests. There is not a single "best way" however, based on the TAP-TS experiences, the following general guidelines are offered:

- **The process of the adoption and adaptation of the LTPs materials should be consistent with the key principles of the LTP design process** - respecting diversity, emphasizing participation, and learning from locally-based knowledge and activities.
- In formal education, it can be very difficult to make room for new content. Opportunities should be explored to **adopt the LTPs materials within existing educational programmes. LTPs have been built as flexible resources, and teachers can benefit from the full LTPs, as well as from separate Units or even Activities.**
- **Most activities suggested in LTPs provide a bridge between science and the humanities that can help to enhance the role of interdisciplinary studies in our educational systems.** This involves action-oriented learning, such as community outreach activities; a field trip to experience a specific context or situation addressed in class; learning activities that model real life situations, such as role-playing; and, "hands on" education experiences with research-oriented activities. Such experiences are essential to bridging the gap between sustainability values and real-life actions. It also provides opportunities to experience what it means to implement an ethical principle within one's community and personal life.
- **Promote social and professional networks to connect learners and educators** through webs of interaction and relationship that develop shared knowledge as well as professional support.
- **Embrace dynamic and continuous generative reflective practices** to more effectively and more confidently navigate the complexities of contemporary education and prompt meaningful improvements in teaching and learning experiences. For this, the Follow-Up Activities in LTPs with the focus on reflection on practice can be adopted and adapted to different needs.



- **Involve student teachers, colleagues as part of the team in the co-design process.** TAP-TS teachers and student teachers were actively involved as part of the evaluation activities of the early materials. The process was altered to involve them directly in iterative content development to align with their needs, working collaboratively with all partners. The process led to a much more needs-relevant and context-specific product.



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APPENDICES

APPENDIX A. DESIGN ROADMAP

TAP-TS Roadmap has three main goals: (1) for the TAP-TS partners as a roadmap to design LTPs; (2) for teachers and student teachers to design materials for teaching sustainability; (3) evaluation of LTPs. Explore the visualisation following this [link](#).

1: CLARIFY THE GOAL	<p>The overarching goal of an LTP is to enable and encourage learners and teachers to think and act sustainably. To actively participate in the discourse on sustainability, the topics must also be addressed - sustainably - in schools and universities. The goal of TAP-TS is to create learning and teaching packages for this purpose in the following areas:</p> <ol style="list-style-type: none"> 1 A Sustainable Europe. 2 Sustainability and Digitality. 3. Sustainability and Environmental Education. 4 Climate Crisis Resilience. 5 Dealing with Climate Disinformation. 6 Green Citizenship in/for Europe. 7 Sustainable Entrepreneurship Education.
2: COMPETENCY AREAS	<p>The LTPs should be aligned with the interconnected four competence areas defined in the <i>GreenComp</i> Framework: • Embodying sustainability values • Embracing complexity in sustainability • Envisioning sustainable futures • Acting for sustainability. Each activity should be aimed to target a number of competences presented in the Framework and connect to a set of learning outcomes for each LTP unit.</p>
3: NETWORKING & BUNDLE EXPERTISE	<p>There are many exciting topics. 1. Find a focus: what driving question is at the centre. 2. See what resources are available (competencies, teaching-learning materials, etc.). 3. Network with colleagues and partner institutions; locally, regionally, and nationally.</p>
4: WORKING THROUGH THE DESIGN PROCESS	<p>Teaching Sustainability should be: interdisciplinary, participatory and democratic approaches, action-oriented; minds-set changing; hands-on, focussing on real life challenges; stimulate creative collaboration between teachers and learners; visions-oriented; and of course reflective. Approaches to teaching sustainability may be inquiry-based learning; explorative learning; networked learning; participation learning aimed at problem framing. Teaching Sustainability may incorporate the following activities: collaborative projects, future framing workshops, research and analysis, discussion, and reflection.</p>
5: DO IT AND HAVE FUN	<p>The Step is focused on trying out the ideas, materials and discuss these with colleagues.</p>
6: REFLECTION & ASSESSMENT DESIGN	<p>In TS assessment can be multifaceted and primarily encourage reflection for action and future-oriented thinking. There is not always ONE right answer. The goal should be to RAISE QUESTIONS. TS is not about teaching the „right“ behaviour, but about practising a critical perspective. Give TS an important place in curricula and implement credits, badges, or awards for it. Important is to reflect not only on the experiences but also on what action can be taken or requested to maintain and restore ecosystems and enhance justice. Reflection to construct a vision for a more sustainable future is what guides the Follow-Up activity of each LTP Unit. .</p>
7: PUBLISH TO TAP-TS PLATFORM	<p>Share and publish your materials under a Creative Commons licence as free as possible. Because that is sustainable!</p>

APPENDIX B. GREENCOMP FRAMEWORK

[Here](#) you can watch a video developed by TAP-TS (ZLI/PHW) for TAP-TS Stakeholders presenting the GreenComp Framework

Visualisation used for the GreenComp competence areas and competences:



Green Competence Areas and Competences: Source: Bianchi, G., Pisiotis, U., Cabrera Giraldez, M. GreenComp – The European sustainability competence framework. Bacigalupo, M., Punie, Y. (editors), EUR 30955 EN, Publications Office of the European Union, Luxembourg, 2022:

Competence Areas	Competences
Embodying sustainability values	<ul style="list-style-type: none"> Valuing sustainability Supporting fairness Promoting nature
Embracing complexity and sustainability	<ul style="list-style-type: none"> Systems thinking Critical thinking Problem framing
Envisioning sustainable futures	<ul style="list-style-type: none"> Futures literacy Adaptability Exploratory thinking
Acting for sustainability	<ul style="list-style-type: none"> Political agency Collective action Individual initiative



APPENDIX C. LEVELS AND DIMENSIONS OF REFLECTION IN THE TAP-TS MARIA FRAMEWORK (AN EXAMPLE OF PROMPTS FOR REFLECTION)

<p>Prompts for reflection on the student experience</p>	<p>In what ways do these activities contribute to the global educational goals for your students?</p> <p>In what ways do the activities engage your students with different knowledge areas and subjects of the curriculum? In what ways can these activities be connected with different subjects/ areas of the curriculum?</p> <p>In what ways the activities could engage your students with different knowledge areas and subjects of the curriculum? In what ways these activities could be connected with different subjects of the curriculum?</p> <p>Can the previous activities contribute to all students' participation and learning? What actions can you take to ensure the learning of all students?</p> <p>To what extent do the activities promote awareness and responsibility among your students?</p> <p>Did the implemented educational materials, methods or tools increase or rather limit the opportunity to increase students' environmental awareness?</p> <p>Do the current resources and equipment available in your institution adequately support the activities you have selected and implemented from LTP materials, or are there enhancements needed?</p> <p>To what extent can you involve the local community or connect with community issues related to the sustainability theme approached?</p> <p>Can you adapt the assessment methods or the requirements for students after integrating the educational materials, methods, or tools into your existing teaching concept? If yes, in which way/how?</p>
<p>Prompts for reflection on school and school community engagement</p>	<p>Within the school or learning context, how have the activities helped the learners in terms of embodying sustainability values, acting for a sustainable future and/or envisioning a more sustainable future?</p> <p>How have the activities contributed to collaboration with others at school or institutional level to approach a sustainability issue from different perspectives, knowledge areas and contexts?</p> <p>Do the educational materials, tools and methods you have implemented also offer potential for use in other subjects? If so, in which subjects?</p> <p>How have the activities contributed to engage with different perspectives to consider sustainability challenges and opportunities?</p> <p>How have the activities encouraged the students to be aware of their individual and collective impact on nature, and provided opportunities to restore it at school level?</p> <p>How did you try to enable students to use resources for learning at school in a sustainable way?</p> <p>Have the selected and implemented educational methods, tools and materials encouraged you to initiate cooperation with external partners (associations, companies, NGOs, etc.) to enrich learning experiences? If so, in which areas are you aiming for cooperation?</p> <p>To what extent does your teaching practice encourage students to use evidence, combine knowledge and resources to analyse and evaluate futures and their opportunities, limitations and risks, and contribute to decision-making at school level?</p>



Prompts for reflection on wider community and societal engagement

How have the activities added to the knowledge and understanding of the learners in terms of working with others in the broader community to create inclusive visions for a more sustainable future?

How have the activities encouraged students to draw on different perspectives, and subject knowledge to identify interconnections, and reflect on one's own environmental, cultural and economic impact?

How do the activities help reflect on, identify, envision or even shape the trajectory towards a collective preferred future that includes various perspectives, cultures, traditions, and are grounded in values for sustainability?

How have the activities contributed to grasp connections and interactions between natural events and human actions?

Did the activities encourage students to assess and question their needs to carefully manage resources in the pursuit of longer-term goals and common interests?

How did the activities help them to think critically about information sources and communication channels on sustainability to assess the quality of the information they provide?

To what extent do the activities engage in democratic decision making and civic activities for sustainable development?

How does your teacher practice encourage students' intentions and willingness to give back to the community and nature?

To what extent does your teaching practice encourage students to use evidence, combine knowledge and resources to analyse and evaluate futures and their opportunities, limitations and risks, and contribute to decision-making, and become agents of change?



APPENDIX D. OVERVIEWS OF LEARNING AND TEACHING PACKAGES

LTP 1. A Sustainable Europe

Learning and Teaching Package 1 ‘A sustainable Europe’, provides introductory activities for addressing sustainability within secondary education and teacher education. The LTP is guided by three main questions:

- What does sustainability and sustainability education mean to me, in Europe and around the world?
- Why is sustainability important?
- How can we support young people to engage with sustainability issues and act for sustainability?
- How can we practice equitable and just education for sustainable futures?

Unit 1 ‘Sustainability and Me’ engages learners to consider what sustainability and sustainability education mean to them personally and in European and international discourses. It is intended for use with secondary-level students, but some activities may be adapted for use with primary level and/or in teacher education (with student teachers and serving teachers). The unit is divided into four main sections: sustainability values, sustainability thinking, envisioning sustainable futures and acting for sustainability. These sections reflect the four dimensions of GreenComp, the European Commission’s framework for sustainability competences (Bianchi et al, 2021). Each section includes start-up, development, consolidation and follow-up activities linked to learning objectives.

Unit 2 ‘Envisioning a Sustainable Europe’ invites participants to imagine the European Union (EU) as a sustainable society, while diving deep into the current risks towards a sustainable EU and opportunities that are being taken to contribute to one. It poses several key ‘why?’ questions: Why is it important to be sustainable? Why should we know the risks? Why and how can certain opportunities for a sustainable Europe be created? Intended for use with secondary level students, the unit aims at exploring how students and teachers can act for change for a sustainable Europe.

Unit 3 ‘Education for Sustainable Futures’ engages educators to critically consider the potential of education to support the transition to more just and sustainable futures. The unit is divided into four sections. It is intended for use in teacher education (with student teachers and serving teachers). In section 1, (Start-Up) ‘Education and Un-sustainability’ participants explore the potential of education to reproduce and/or transform society, articulate what unsustainable and sustainable education looks like, and explore the European Commission’s GreenComp framework as an example of sustainability competences. Section 2, (Development) ‘Decoloniality and education for sustainable futures’ focuses on the perspective of decoloniality for sustainable futures, making links between coloniality/modernity and unsustainability and identifying ways of decolonizing education in classrooms and schools. In section 3, (Consolidation) ‘Identities and



discrimination in education' participants consider how personal and social identities intersect with privilege and discrimination in education. Finally, section 4 (Follow-Up): 'Future-oriented reflection and action' includes further questions to stimulate awareness, thinking and action.

Unit 4 'Multilingual Education and Sustainability' explores multilingual education and the connections with sustainability in theory and practice. It is intended for use in teacher education (with student teachers and serving teachers). Premised on the recognition that language is intertwined with almost every aspect of education (including our construction of social contexts and activities, and pedagogical processes, goals and activities) this unit is of relevance for educators of all curriculum subjects. The unit is divided into four sections: language foundations, exploring multilingualism, enabling multilingual education in our classrooms and schools, and multilingual education and education for sustainable futures.

These activities are intended as suggestions and starting points, and we invite and encourage teachers to select, adapt and supplement these with their own activities.

Pedagogical Approach

This LTP takes an active-reflective approach to learning. Activities in this unit are designed to bridge learners' understandings and priorities with international discourse around sustainability issues and potential solutions. Individual and collaborative activities guide learners to articulate, question and develop their understanding with a focus on real-world challenges. Analytical and critical thinking are fostered through visual mapping techniques, such as mind maps, rich pictures, and theory of change. Participants' diverse experiences, understandings and priorities are recognized as a resource for collaborative learning. Transformative learning is fostered through critical analysis of underlying causes of unsustainability, and the connection with fundamental beliefs and values, and embedded behaviors. There is an emphasis on identifying practical action to promote sustainability.

Sustainability is a complex, emotive and controversial topic. As educators, it is important to present a range of sustainability perspectives, protect learners' wellbeing and respect participant's right to form a personal opinion and position, as articulated in the 'Beutelsbach Consensus'.

These units are particularly well-suited to inter-disciplinary projects, and we suggest collaboration between teachers of different subjects to apply and adapt activities at school. The roles of teachers and learners may be quite different from regular subject teaching, and it is worth spending time at the start of the unit establishing 'ground rules' for working to promote a safe, inclusive and student-centered atmosphere. It is also important to develop ground rules for constructive dialogue.



For ideas about what this includes, see the following video: [What is Educational Dialogue?](#)

UNIT 1 SUSTAINABILITY AND ME					
Main Topic	Target Group	Duration	Knowledge Area/ Subjects in School	Activities	Possible assessment
<p>This unit engages learners personally with the concept of sustainability and the sustainable development goals. Through critical exploration and action in relation to a local issue of their choice learners gain a hands-on experience of ESD. The unit aims to foster transformative learning, and individual and collective action towards sustainable futures.</p>	<p>Secondary -level students (11 years-16 years); student teachers and serving teachers.</p>	<p>A project week A series of four, 90 minute – 180 minute workshops</p>	<p>Civic education, political education, ethics, and/or interdisciplinary projects</p>	<p>Start-Up <u>Activity 1. 'Me map'</u> <u>Activity 2.</u> <u>'Perspectives on sustainability'</u> <u>Activity 3.</u> <u>'Sustainability values'</u> Development <u>Activity 4. 'Web of life'</u> <u>Activity 5.</u> <u>'Investigating the SDGs as systemic issues'</u> <u>Activity 6. 'What concerns you?'</u> <u>Activity 7. 'Thinking systematically'</u> Consolidation <u>Activity 8. 'Advice for the future'</u> <u>Activity 9. 'Ideal futures'</u> Follow-Up <u>Activity 10.</u> <u>'Impact/feasibility matrix'</u> <u>Activity 11. 'River diagram'</u> <u>Activity 12. 'SMART action plan'</u></p>	<p>Self-and peer assessment based on the learning objectives for each activity; Self- and peer-assessment based on 'ground rules' for constructive and collaborative learning.</p>
<p>Intended Learning Outcomes</p>	<p>Having worked through the activities and materials, students will be able to:</p> <ul style="list-style-type: none"> ✓ Articulate personal values and consider how values differ between individuals and communities and vary over time ✓ Define the term 'sustainability', personally and in relation to international discourse ✓ Discuss the UN Sustainable Development Goals, in general and with some specific examples of goals and targets ✓ Describe sustainability values, and what these might look like in practice, and possible tensions between them ✓ Apply systems thinking to explore a sustainability issue ✓ Envision sustainable futures by imagining and developing alternative scenarios ✓ Identify the steps needed to achieve a preferred sustainable future. ✓ Plan, do, record and review actions for sustainability 				



Prior Competencies	optional/ideal: Unit 1. 'A sustainable Europe'	
Required materials	Flipchart paper/poster paper Marker pens in different colors Tape for sticking posters to walls Space for students to move around and work in groups Laptops and internet for research into topics (optional)	
Cooperation/ Networking	This unit can be used to engage students as part of a whole school approach /see LTP6). Teachers are encouraged to work with local ESD NGOs to co-facilitate activities.	
Practical Notes for Teachers	This unit may work particularly well as part of a project week at school, or an extra-curricular club.	
Addressing GreenComp	Embodying sustainability values	
	X	1.1 Valuing sustainability To reflect on personal values; identify and explain how values vary among people and over time, while critically evaluating how they align with sustainability values.
		1.2 Supporting fairness To support equity and justice for current and future generations and learn from previous generations for sustainability.
		1.3 Promoting nature To acknowledge that humans are part of nature; and to respect the needs and rights of other species and of nature itself in order to restore and regenerate healthy and resilient ecosystems.
	Embracing complexity in sustainability	
	X	2.1 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.
	X	2.2 Critical thinking To assess information and arguments*, identify assumptions, challenge the status quo, and reflect on how personal, social and cultural backgrounds influence thinking and conclusions.
		2.3 Problem framing To formulate current or potential challenges as a sustainability problem in terms of difficulty, people involved, time and geographical scope, in order to identify suitable approaches to anticipating and preventing problems, and to mitigating and adapting to already existing problems.
	Envisioning sustainable futures	
	X	3.1 Futures literacy To envision alternative sustainable futures by imagining and developing alternative scenarios and identifying the steps needed to achieve a preferred sustainable future
		3.2 Adaptability To manage transitions and challenges in complex sustainability situations and make decisions related to the future in the face of uncertainty, ambiguity and risk.
	X	3.3 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	
	X	4.1 Political agency To navigate the political system, identify political responsibility and accountability for unsustainable behaviour, and demand effective policies for sustainability.
X	4.2 Collective action To act for change in collaboration with others.	
x	4.3 Individual initiative To identify own potential for sustainability and to actively contribute to improving prospects for the community and the planet.	

UNIT 2 ENVISIONING A SUSTAINABLE EUROPE

Main Topic	Target Group	Duration	Knowledge Area	Activities	Possible assessment
Envisioning a Sustainable Europe taking different dimensions of sustainability.	Secondary school teachers and student teachers with activities for secondary level students	240 – 300 minutes. Not counting reading time.	1: Sustainability 2: Threats & Opportunities 3: Measures of promotion 4: Decision-making	Start-Up A1. Your vision for a sustainable Europe A2. Sustainability Bingo Development A1. Greenwashing – how to spot climate lies. A2. Drastic about plastic workshop A3. Are we paying big companies to kill us? Consolidation A1. Role-Play Decision-Making Follow-Up	Imagination scenarios



				A1. Our Right. Our Planet! A2. Reflection A3. Reflection on Teacher Practice																																					
Intended Learning Outcomes	<p>Having worked through the activities and materials, students will be able to:</p> <ul style="list-style-type: none"> ✓ Describe some historical opportunities and threats in relation to Europe and global sustainability. ✓ Describe their vision of ,a sustainable Europe in relation to environment, society and economy. ✓ Describe a range of European measures which promote sustainability, in Europe and globally. ✓ Describe how they and their students can be part of European decision-making. 																																								
Prior Competencies	<p>obligatory:</p> <ul style="list-style-type: none"> • No basic competencies needed, Basic level of understanding proffered. <p>optional/ideal:</p> <ul style="list-style-type: none"> • Ability to collaborate and be cooperated to support group activities and have autonomy to participate. <p>Digitally literate to a level that allows to engage meaningfully with the materials provided in this unit</p>																																								
Required materials	<ul style="list-style-type: none"> • Laptop and access to internet • Paper and writing materials 																																								
Cooperation/ Networking	Exploring and connecting to local eco-shops and community organizations related to sustainability																																								
Practical Notes for Teachers	Educators should be aware that different groups of people may cause activities to be longer or shorter. Materials can vary depending on if the event is online or in person.																																								
Addressing GreenComp	<p>Embodying sustainability values</p> <table border="1"> <tr> <td>X</td> <td>1.1 Valuing sustainability</td> <td>To reflect on personal values; identify and explain how values vary among people and over time, while critically evaluating how they align with sustainability values.</td> </tr> <tr> <td>X</td> <td>1.2 Supporting fairness</td> <td>To support equity and justice for current and future generations and learn from previous generations for sustainability.</td> </tr> <tr> <td>X</td> <td>1.3 Promoting nature</td> <td>To acknowledge that humans are part of nature; and to respect the needs and rights of other species and of nature itself in order to restore and regenerate healthy and resilient ecosystems.</td> </tr> </table> <p>Embracing complexity in sustainability</p> <table border="1"> <tr> <td>X</td> <td>2.1 Systems thinking</td> <td>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.</td> </tr> <tr> <td>X</td> <td>2.2 Critical thinking</td> <td>To assess information and arguments*, identify assumptions, challenge the status quo, and reflect on how personal, social and cultural backgrounds influence thinking and conclusions.</td> </tr> <tr> <td>X</td> <td>2.3 Problem framing</td> <td>To formulate current or potential challenges as a sustainability problem in terms of difficulty, people involved, time and geographical scope, in order to identify suitable approaches to anticipating and preventing problems, and to mitigating and adapting to already existing problems.</td> </tr> </table> <p>Envisioning sustainable futures</p> <table border="1"> <tr> <td></td> <td>3.1 Futures literacy</td> <td>To envision alternative sustainable futures by imagining and developing alternative scenarios and identifying the steps needed to achieve a preferred sustainable future</td> </tr> <tr> <td></td> <td>3.2 Adaptability</td> <td>To manage transitions and challenges in complex sustainability situations and make decisions related to the future in the face of uncertainty, ambiguity and risk.</td> </tr> <tr> <td>X</td> <td>3.3 Exploratory thinking</td> <td>To adopt a relational way of thinking by exploring and linking different disciplines, using creativity and experimentation with novel ideas or methods.</td> </tr> </table> <p>Acting for sustainability</p> <table border="1"> <tr> <td>X</td> <td>4.1 Political agency</td> <td>To navigate the political system, identify political responsibility and accountability for unsustainable behaviour, and demand effective policies for sustainability.</td> </tr> <tr> <td>X</td> <td>4.2 Collective action</td> <td>To act for change in collaboration with others.</td> </tr> <tr> <td>X</td> <td>4.3 Individual initiative</td> <td>To identify own potential for sustainability and to actively contribute to improving prospects for the community and the planet.</td> </tr> </table>					X	1.1 Valuing sustainability	To reflect on personal values; identify and explain how values vary among people and over time, while critically evaluating how they align with sustainability values.	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UNIT 3 EDUCATION FOR SUSTAINABLE FUTURES

Main Topic	Target Group	Duration	Knowledge Area/ Subjects in School	Activities	Suggestions for assessment
Realising the potential of education for	Student teachers and teachers of all subjects	6-12 hours to cover all aspects of this unit	Teacher Education, Ethics, political education, civic education	Start-Up Activity 1. Debate and deliberation:	Learning journal, charting personal



sustainable futures			<p>'education can transform society'</p> <p>Activity 2. Education and un-sustainability</p> <p>Activity 3. Sustainability competences</p> <p>Development</p> <p>Activity 4. Theory of change</p> <p>Activity 5. The house that modernity built</p> <p>Consolidation</p> <p>Activity 6. Personal and social identities</p> <p>Activity 7. Privilege walk education</p> <p>Follow-Up</p> <p>Activity 8. Further reflection and discussion questions</p> <p>Activity 9. Reflection-action questions</p>	responses to activities, further reading and testing of activities
Intended Learning Outcomes	<p>Having worked through the activities and materials, student teachers will be able to:</p> <ul style="list-style-type: none"> ✓ Critically reflect on the potential of education to transform society ✓ Identify aspects of education which undermine and support sustainability ✓ Consider competences for a sustainable future and critically explore the GreenComp framework of sustainability competences ✓ Identify practices for educators that support the transition to sustainable futures ✓ Critically reflect on personal beliefs about sustainability, and the role of education in the transition to sustainable futures in relation to diverse narratives ✓ Explore the perspective of decoloniality in relation to sustainability ✓ Identify how decoloniality can be practiced in education in support of sustainable futures. ✓ Critically reflect on personal identities, and how these are experienced in particular social contexts ✓ Explore shared and diverse identities, build community and encourage empathy. ✓ Consider how aspects of personal and social identities privilege and disadvantage children and young people in education in Europe ✓ Reflect on the connection between discrimination in education and education for sustainability ✓ Identify actions for teachers and school communities to reduce or prevent discrimination, to change discriminatory systems and to support marginalised people in systems of oppression. 			
Prior Competencies	<p>optional/ideal: Unit 1. 'A sustainable Europe' Unit 2. 'Sustainability and me'</p>			



Required materials	Big sheets of paper, pens of various colours, space for collaborative learning.	
Cooperation/ Networking	This unit is well-suited to interdisciplinary work, because the issues raised are relevant for all subjects and subject teachers. Moreover, it is powerful if colleagues can build shared understanding and commitment for anti-discrimination education. We also recommend you work with local anti-discrimination education organisations or networks to consider how best to use and learn from these materials.	
Practical Notes for Teachers	Sustainability is a complex, emotive and controversial topic and this should be reflected in your learning and teaching activities. It is important to respect participant's right to form a personal opinion and position, as articulated in the ' Beutelsbach Consensus '. Please also consider the well-being of all of your learners. Consult experts in sustainability and anti-discrimination education if you are unsure.	
Addressing GreenComp	Embodying sustainability values	
	X	1.1 Valuing sustainability To reflect on personal values; identify and explain how values vary among people and over time, while critically evaluating how they align with sustainability values.
	X	1.2 Supporting fairness To support equity and justice for current and future generations and learn from previous generations for sustainability.
		1.3 Promoting nature To acknowledge that humans are part of nature; and to respect the needs and rights of other species and of nature itself in order to restore and regenerate healthy and resilient ecosystems.
	Embracing complexity in sustainability	
	X	2.1 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.
	x	2.2 Critical thinking To assess information and arguments*, identify assumptions, challenge the status quo, and reflect on how personal, social and cultural backgrounds influence thinking and conclusions.
		2.3 Problem framing To formulate current or potential challenges as a sustainability problem in terms of difficulty, people involved, time and geographical scope, in order to identify suitable approaches to anticipating and preventing problems, and to mitigating and adapting to already existing problems.
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		3.1 Futures literacy To envision alternative sustainable futures by imagining and developing alternative scenarios and identifying the steps needed to achieve a preferred sustainable future
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	x	3.3 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	
	x	4.1 Political agency To navigate the political system, identify political responsibility and accountability for unsustainable behaviour, and demand effective policies for sustainability.
	x	4.2 Collective action To act for change in collaboration with others.
x	4.3 Individual initiative To identify own potential for sustainability and to actively contribute to improving prospects for the community and the planet.	

UNIT 4. MULTILINGUAL EDUCATION AND SUSTAINABILITY

Main Topic	Target Group	Duration	Knowledge Area/ Subjects in School	Activities	Suggestions for assessment
Multilingual education and sustainability	Student teachers and teachers of all subjects	6-12 hours to cover all aspects of this unit	Teacher Education, all subjects	Start-Up Activity 1. Our languages Activity 2. Language ideologies and realities Activity 3. How can we use language so that everyone can participate and learn? Development	Learning journal, charting personal responses to activities, further reading and testing of activities



				<p>Activity 4. Metaphors of multilingualism</p> <p>Activity 5. Orientations to multilingualism and educational practice</p> <p>Consolidation</p> <p>Activity 6. Exploring multilingual pedagogies</p> <p>Follow-Up</p> <p>Activity 7. Multilingual education and sustainability</p>	
Intended Learning Outcomes	<p>Having worked through the activities and materials, student teachers will be able to:</p> <ul style="list-style-type: none"> ✓ reflect on and share the languages they use/have used ✓ critically consider monoglossic ideology in relation to research-based understandings of multilingualism, language and education ✓ identify language strategies to help multilingual learners participate and learn ✓ reflect on personal understandings of multilingualism ✓ consider three orientations to multilingualism and their practical implications in education ✓ reflect on a range of educational strategies and resources for multilingual education ✓ identify connections between multilingual education and sustainability 				
Prior Competencies	<p>optional/ideal:</p> <ul style="list-style-type: none"> • Sustainability and me • A sustainable Europe • Education for sustainable futures 				
Required materials	Big sheets of paper, pens of various colours, space for collaborative learning.				
Cooperation/ Networking	This unit is well-suited to interdisciplinary work, because language issues are relevant for all subjects and the whole school. Moreover, it is powerful if colleagues can build shared understanding and commitment for multilingual education together, and develop pedagogical strategies within and between subjects. We provide links to further resources and networks.				
Practical Notes for Teachers	The activities in this unit can be used flexibly depending on the time available and the previous experience of learners.				
Addressing GreenComp	Embodying sustainability values				
	X	1.1 Valuing sustainability	To reflect on personal values; identify and explain how values vary among people and over time, while critically evaluating how they align with sustainability values.		
	X	1.2 Supporting fairness	To support equity and justice for current and future generations and learn from previous generations for sustainability.		
		1.3 Promoting nature	To acknowledge that humans are part of nature; and to respect the needs and rights of other species and of nature itself in order to restore and regenerate healthy and resilient ecosystems.		
	Embracing complexity in sustainability				
X	2.1 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.			



x	2.2 Critical thinking	To assess information and arguments*, identify assumptions, challenge the status quo, and reflect on how personal, social and cultural backgrounds influence thinking and conclusions.
	2.3 Problem framing	To formulate current or potential challenges as a sustainability problem in terms of difficulty, people involved, time and geographical scope, in order to identify suitable approaches to anticipating and preventing problems, and to mitigating and adapting to already existing problems.
Envisioning sustainable futures		
	3.1 Futures literacy	To envision alternative sustainable futures by imagining and developing alternative scenarios and identifying the steps needed to achieve a preferred sustainable future
x	3.2 Adaptability	To manage transitions and challenges in complex sustainability situations and make decisions related to the future in the face of uncertainty, ambiguity and risk.
x	3.3 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		
x	4.1 Political agency	To navigate the political system, identify political responsibility and accountability for unsustainable behaviour, and demand effective policies for sustainability.
x	4.2 Collective action	To act for change in collaboration with others.
x	4.3 Individual initiative	To identify own potential for sustainability and to actively contribute to improving prospects for the community and the planet.

LTP 2. Digitality and sustainability

The Learning and Teaching Package introduces the relationship between digitality and sustainability. Knowledge and pedagogical materials on topics such as harmful effects of digital technologies on the environment, the importance of digital technologies to deal with the climate crisis, and the social inequalities and social dependencies arising from digital infrastructures are addressed.

Unit 1 Introduction to Sustainability and Digitality introduces basic knowledge about the relationship between digitality and sustainability. The aim is to understand which ecological, economic and social challenges the digital world poses from a global perspective. But technologies have always been instruments of world measurement, also of world exploration, and thus can make a significant contribution to mitigating the climate crisis. To understand these interrelationships, the terms sustainability and digitality are defined first. Participatory exercises are part of the unit, as well as introductory materials for students and teachers.

Unit 2 My Smartphone. Planet Earth and Me shows how closely our daily companion is linked to the topic of sustainability. Various questions are raised based on the life cycle of a smartphone: What components does a smartphone consist of and what raw materials does it require? In which regions of the world are these raw materials mined? How long is the average useful life of a smartphone and how can old devices be reused or recycled in a meaningful way? The unit encourages critical analysis in order to make our own media behaviour more conscious and sustainable.

Unit 3 The Digital Technology Network on the Globe deals with the complex interactions of digitalisation from a global perspective. In this unit, various physical and digital world maps are used to illustrate the global impact on natural resources. Participants explore where undersea cables run and learn about the concepts of the ecological footprint and handprint. The growing amount of electronic waste is also used to address the global imbalance brought about by the digital transformation.

Unit 4 With or Without Technology has a clear focus on questions about the future. The focus is on *raising ideas, questions, concepts*, etc. oriented towards existing theories on developments in the IT sector. Participants are confronted with the following questions: In which future do you want to live in, considering 'the needs of the present without compromising the ability of future generations to meet their own needs' (United Nations, 1987)?

Each Unit includes a [Follow-Up Activity](#) for teachers to reflect on their practice in view of integrating the topic of sustainability into their practice, [TAP-TS Roadmap](#) that can be seen as a visualisation of materials design, and a [Template](#) for developing teaching and learning materials with guiding questions.

Pedagogical Approach

Unit 1 starts by explaining scientific findings and making them easily accessible (by learning videos and interactive images). This should provide learners with a level of expertise and to guide them towards further research. This should make clear that research is always a discourse. *There can never be one right answer, but many questions will be raised.* The participants, and learners are encouraged to reflect on their role within the subject area and to experience the topics of digitality, environment and sustainability in a hands-on way through real-life experiments with digital devices in a face-to-face setting. For this we use sensors of smartphones as well as smartphone microscopes to explore the natural environment with digital devices.

The activities in Unit 2 provide knowledge based on scientific evidence from an interdisciplinary research perspective. Students are encouraged to reflect on their own role in the field and to experience the topics of digitality, the environment and sustainability in a hands-on way, for example by disassembling real-life digital devices to see what is “inside the box”. The topics and tasks are chosen in such a way that it becomes clear that the aim is to deal with questions about future and alternative forms of action. The activities of this unit aim to enhance students’ and school students’ exploratory thinking, exploring and use of various disciplines, using creativity and experimentation. The activities engage students and school students in teamwork and encourage them to take different roles.

Unit 3 attempts to vividly convey the unwieldy topic of post/-colonial relations. This is done by working with different materials and the - hands-on - representation of digital connectedness across the globe. The participants are encouraged to reflect on the experiences and to transfer this into the conception of a teaching-learning setting with students. The materials are to give ideas to bring them into teacher education and schools and can be adapted for various contexts and enriched further.

Unit 4 starts with a video that introduces current issues in the field of digital developments. Terms explained in this video include robotics, artificial intelligence and digital capitalism. The video refers to issues of social, environmental and economic sustainability. In addition, further sources are provided. In a future workshop (‘Zukunftswerkstatt’), the participants are encouraged to sketch possible future developments of one or more trends discussed in the video in teams. The aim is not to draw future scenarios that are as realistic as possible. It is about imagining a version of the future that is as dystopian or utopian as possible, as well as discussing the question of whether or not such a future will come to pass. At the end of the unit the groups present their ideas of a future to each other. As a conclusion, a joint statement is drafted and published summarizing these actions.

Sustainability and Digitality: Importance of the theme

The aim of this LTP is to provide teachers, student teachers as well as students in schools research-based but easy accessible information on the use of digital devices which accompany us and our children at almost every moment of our lives. It aims to focus on the benefits and risks of living in the digital age, and to imagine a more sustainable future with technology. At the centre of the LTP is the multifaceted relationship between digitality, sustainable development and our social community.

UNIT 1. INTRODUCTION TO SUSTAINABILITY AND DIGITALITY					
Main Topic	Target Group	Duration	Knowledge Area/ Subjects in School	Activities	Suggestions for Possible assessment
Introduction to the central terms and arguments such as digitality and sustainability/sustainable development	Pre- and Inservice-Teachers for students (6-10y), some materials for students in school (6-10y)	Min 195 min	Science (Biology, Physics, Geography), Media Education	<p>Start-Up Activity 1: What is Sustainability?</p> <p>Activity 2: What is Digitality?</p> <p>Activity 3: The relationship between digital technology and sustainability</p>	<p>Quiz on definitions of sustainability and digitality</p> <p>Documented Self-reflection</p>



				<p>Development: Explore the environment with your smartphone</p> <p>Consolidation: Influence of digital technologies</p> <p>Follow-Up: Activity1: Sharing Experience Activity2: Reflection on teacher practice</p>
Intended Learning Outcomes	<p>Having worked through the activities and materials, students will be able to:</p> <ul style="list-style-type: none"> ✓ Define the terms digitality and sustainability in their diversity and use them in conversations. ✓ Describe ecological, social and economic impacts of digital technologies on the basis of scientific findings. ✓ Build up a basic knowledge of the importance of digital technologies for the study of natural phenomena and use it for educational practice. ✓ Find and adapt further information and integrate it into their own teaching. ✓ Use the acquired knowledge for school and extracurricular projects. 			
Prior Competencies	<p>Obligatory:</p> <ul style="list-style-type: none"> • nothing <p>optional/ideal:</p> <ul style="list-style-type: none"> • An initial introduction to the terms sustainability and digitality is useful. • A first introduction with regulations and provisions on sustainability by the European Commission is useful. 			
Required materials	<ul style="list-style-type: none"> • Smartphone or Tablet • Paper and Pencil • Smartphone Microscope • APP: phyphox • APP: BookCreator 			
Cooperation/ Networking	<ul style="list-style-type: none"> • Public STEM research facilities for children (for Austria: https://www.science-center-net.at/, especially Knowledge room Vienna: https://www.science-center-net.at/type-projekte/wissensraum-english/) 			
Practical Notes for Teachers	<p>Some materials, quizzes, interactive boards are located on the TAP-TS platform, in a Moodle Course. Make sure that you log in as a guest first to be able to access those - https://tap-ts.eu/course/view.php?id=12</p>			
Addressing GreenComp	Embodying sustainability values			
	x	1.1 Valuing sustainability	To reflect on personal values; identify and explain how values vary among people and over time, while critically evaluating how they align with sustainability values.	
		1.2 Supporting fairness	To support equity and justice for current and future generations and learn from previous generations for sustainability.	
	x	1.3 Promoting nature	To acknowledge that humans are part of nature; and to respect the needs and rights of other species and of nature itself in order to restore and regenerate healthy and resilient ecosystems.	
	Embracing complexity in sustainability			
	x	2.1 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.	
		2.2 Critical thinking	To assess information and arguments*, identify assumptions, challenge the status quo, and reflect on how personal, social and cultural backgrounds influence thinking and conclusions.	
		2.3 Problem framing	To formulate current or potential challenges as a sustainability problem in terms of difficulty, people involved, time and geographical scope, in order to identify suitable approaches to anticipating and preventing problems, and to mitigating and adapting to already existing problems.	
	Envisioning sustainable futures			
x	3.1 Futures literacy	To envision alternative sustainable futures by imagining and developing alternative scenarios and identifying the steps needed to achieve a preferred sustainable future		
x	3.2 Adaptability	To manage transitions and challenges in complex sustainability situations and make decisions related to the future in the face of uncertainty, ambiguity and risk.		



	3.3 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		
	4.1 Political agency	To navigate the political system, identify political responsibility and accountability for unsustainable behaviour, and demand effective policies for sustainability.
x	4.2 Collective action	To act for change in collaboration with others.
x	4.3 Individual initiative	To identify own potential for sustainability and to actively contribute to improving prospects for the community and the planet.

UNIT 2. MY SMARTPHONE. PLANET EARTH AND ME

Main Topic	Target Group	Duration	Knowledge Area/ Subjects in School	Activities	Possible assessment
Understanding the materiality of digitality, using the example of a smartphone	Pre- and in-service teachers, materials are provided for pupils in school (adaptable for 6-14y.o.)	Min 180 min; Run as a half-day workshop or project work for a month: 45 mins – 1 hour a week. Extra time is dedicated to reflections on teacher practice	The materials can be integrated into the curriculum or given as a workshop. Knowledge areas would be: ✓ (Digital) media education ✓ Geography ✓ Technics and Arts ✓ STEM subjects	Start-Up Activity: The Life Cycle of a Smartphone. Development Workshop 1: Unblack the Box! Workshop 2: What's Inside Your Phone? Workshop 3: Pin the Planet! Workshop 4: From Trash to Treasure! Consolidation Activity 1: My Smartphone and me. Activity 2: Phone of the Futu.re Follow-Up Activity 1: Reflection for Actions Activity 2: Reflection on Teacher Practice	a suggestion for a project work; reflective questions
Intended Learning Outcomes	Having worked through the activities and materials, students will be able to: ✓ Reflect on their own media use regarding a more sustainable development. ✓ Name individual phone parts and what they are for ✓ Discuss the notion of “conflict materials”. ✓ Name precious materials in smartphones and where they come from. ✓ Discuss the concept of “upcycling”. ✓ Assess their own impact on a more sustainable development in the context of broader social and capitalist developments.				
Prior Competencies	optional/ideal: Unit 1. Relationship between Digitality and Sustainability				
Required materials	<ul style="list-style-type: none"> Digital devices no longer in use / discarded smartphones Various tools or mobile phone repair kit (see iFIXIT, https://de.ifixit.com) Materials to download - / Downloadable materials and crafts 				
Cooperation/ Networking	<ul style="list-style-type: none"> Local repair café or mobile phone repair shop Recycling collection centre school/college/educational institution (e. g. for collecting mobile phones) NGOs with mobile phone collection campaign (e. g. Jane Goodall Institute) 				



Practical Notes for Teachers	<p>The timing given at the beginning is meant for orientation. The Unit materials can be used as a monthly project, or one long workshop. Activities can be adjusted to suit the timing of the project or workshop.</p> <p>Most parts of this LTP are designed for teaching the last year of primary level, some parts are rather suitable for teaching at secondary level. One will need to adapt the materials to the age group/ level of class.</p>	
Addressing GreenComp	Embodying sustainability values	
	X	1.1 Valuing sustainability To reflect on personal values; identify and explain how values vary among people and over time, while critically evaluating how they align with sustainability values.
	X	1.2 Supporting fairness To support equity and justice for current and future generations and learn from previous generations for sustainability.
		1.3 Promoting nature To acknowledge that humans are part of nature; and to respect the needs and rights of other species and of nature itself in order to restore and regenerate healthy and resilient ecosystems.
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	X	4.2 Collective action To act for change in collaboration with others.
	4.3 Individual initiative To identify own potential for sustainability and to actively contribute to improving prospects for the community and the planet.	

UNIT 3. THE DIGITAL NETWORK ON THE GLOBE

Main Topic	Target Group	Duration	Knowledge Area/ Subjects in School	Activities	Suggestions for possible assessment
Understand the historical development of the digitally-connected world and the digital connectedness across the globe.	Pre- and Inservice-Teachers for students (6-10y), some materials are useful for students (6-10y)	Min 300 min; Run as a half-day workshop or project work for a month: 45 mins – 1 hour a week.	The materials can be integrated into the curriculum or given as a workshop. Knowledge areas would be: ✓ (Digital) media education ✓ Geography ✓ Technics and Arts	Project Journey 1: Find Your Footprint Start-Up Activity 1 . What is Climate Change? Activity 2 . What do you know about the continents? Development Activity 3 . What is a carbon footprint? Consolidation Activity 4 . Find your Footprint Follow-Up Activity 5 . Ecological / Climate Handprint	Project work



				<p>Project Journey 2. Mapping Digital Technology Start-Up Activity 1. What do you see? Activity 2. How does the Internet work? Development Activity 3. Submarine Cables, Data Centres & E-Waste Consolidation Activity 4. Think about the Internet JOINT Follow-Up Activity 1. Reflection and Plan for Action Activity 2. Reflection on Teacher Practice</p>
Intended Learning Outcomes	<p>Having worked through the activities and materials, students will be able to:</p> <ul style="list-style-type: none"> ✓ Reflect on digital connectedness across our globe. ✓ Discuss the concept of “Carbon Footprints”. ✓ Know which countries are the top CO2-producing nations. ✓ Reflect on why some countries have smaller and some have bigger carbon footprints. ✓ Assess the impact of their own media usage on the environment at a global scale. 			
Prior Competencies	<p>optional/ideal: Unit 1 – Relationship between Digitality and Sustainability and / or Unit 2 – My Smartphone, Planet Earth and Me</p>			
Required materials	<ul style="list-style-type: none"> • Illustration of a world map on paper (e. g. DIN A3) or carpet with a world map • Cords, pencils, wooden blocks... 			
Cooperation/ Networking	<ul style="list-style-type: none"> • A possible collaboration with an art museum or gallery on the subject of looted art from colonial territories can also provide further insights. Cultural associations, interest groups or art funding organisations could also be interesting cooperation partners. 			
Practical Notes for Teachers	<p>The unit is organised as two workshops with two different but related foci. Both invite us to consider the materiality of digitality from a global perspective. Workshop 1 asks to think about the carbon footprint and the actions we can take and is more appropriate for primary level. Workshop 2 provides a knowledge base about global connectivity via the Internet and invites to think critically about its organisation from a socio-ecological perspective. It may be more appropriate for secondary school students or adapted for primary school settings. The two workshops can be seen as small project journeys, each going through the stages of start-up, development and consolidation, and ending together with follow-up activities to discuss the key points and reflect on the process. <i>We also advise to look at LTP 3 Environmental Sustainability Unit 4 My Actions for Energy Saving.</i></p>			
Addressing GreenComp	Embodying sustainability values			
	X	1.1 Valuing sustainability	To reflect on personal values; identify and explain how values vary among people and over time, while critically evaluating how they align with sustainability values.	
	X	1.2 Supporting fairness	To support equity and justice for current and future generations and learn from previous generations for sustainability.	
	X	1.3 Promoting nature	To acknowledge that humans are part of nature; and to respect the needs and rights of other species and of nature itself in order to restore and regenerate healthy and resilient ecosystems.	
	Embracing complexity in sustainability			
X	2.1 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.		



X	2.2 Critical thinking	To assess information and arguments*, identify assumptions, challenge the status quo, and reflect on how personal, social and cultural backgrounds influence thinking and conclusions.
x	2.3 Problem framing	To formulate current or potential challenges as a sustainability problem in terms of difficulty, people involved, time and geographical scope, in order to identify suitable approaches to anticipating and preventing problems, and to mitigating and adapting to already existing problems.
Envisioning sustainable futures		
X	3.1 Futures literacy	To envision alternative sustainable futures by imagining and developing alternative scenarios and identifying the steps needed to achieve a preferred sustainable future
X	3.2 Adaptability	To manage transitions and challenges in complex sustainability situations and make decisions related to the future in the face of uncertainty, ambiguity and risk.
x	3.3 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		
X	4.1 Political agency	To navigate the political system, identify political responsibility and accountability for unsustainable behaviour, and demand effective policies for sustainability.
X	4.2 Collective action	To act for change in collaboration with others.
X	4.3 Individual initiative	To identify own potential for sustainability and to actively contribute to improving prospects for the community and the planet.

UNIT 4. WITH OR WITHOUT TECHNOLOGY?

Main Topic	Target Group	Duration	Knowledge Area/ Subjects in School	Activities	Suggestions for assessment
Knowledge about future developments in the IT sector and ideas for a more sustainable development	Pre- and Inservice-Teachers for students 6-10y)	195 min.	<ul style="list-style-type: none"> - (digital) media education - Informatics - Ethics - Politics 	<p>Activity 1. Introductory video – A Future with or without Technology?</p> <p>Activity 2. A Future with or without Technology?</p> <p>Activity 3: OUR RESOLUTION</p> <p>Activity 4: FINAL RESOLUTION</p> <p>Activity 5. Reflection on teacher practice</p>	Workshop-Documentation and Reflection Discussion Co-Creation (written statement)
Intended Learning Outcomes	Having worked through the activities and materials, students will be able to:				
	<ul style="list-style-type: none"> ✓ Define current concepts on developments in the IT sector and enter not a discussion about them. ✓ Work with others on future concepts and outline developments. ✓ Define and argue measures for a more sustainable development in the IT sector. 				
Prior Competencies	obligatory: Unit 1, 2 and 3 from LTP 2				
Required materials	<ul style="list-style-type: none"> • Pen and paper • Laptop / Smartphone / Laptop • Booklet: A Future with or without Technology? 				
Cooperation/ Networking	For more insight, it is worth cooperating with museums on digitality and art (in Austria e.g. Ars Electronica Center, https://ars.electronica.art/news/de/) or with non-university and extracurricular partners with a focus on global learning and digitality.				
Practical Notes for Teachers	Some materials, vidoes, interactive boards are located on the TAP-TS platform, in a Moodle Course. Make sure that you log in first to be able to access those - https://tap-ts.eu/course/view.php?id=12				
	Embodying sustainability values				



Addressing GreenComp	x	1.1 Valuing sustainability	To reflect on personal values; identify and explain how values vary among people and over time, while critically evaluating how they align with sustainability values.
	x	1.2 Supporting fairness	To support equity and justice for current and future generations and learn from previous generations for sustainability.
		1.3 Promoting nature	To acknowledge that humans are part of nature; and to respect the needs and rights of other species and of nature itself in order to restore and regenerate healthy and resilient ecosystems.
	Embracing complexity in sustainability		
	x	2.1 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.
	x	2.2 Critical thinking	To assess information and arguments*, identify assumptions, challenge the status quo, and reflect on how personal, social and cultural backgrounds influence thinking and conclusions.
	x	2.3 Problem framing	To formulate current or potential challenges as a sustainability problem in terms of difficulty, people involved, time and geographical scope, in order to identify suitable approaches to anticipating and preventing problems, and to mitigating and adapting to already existing problems.
	Envisioning sustainable futures		
	x	3.1 Futures literacy	To envision alternative sustainable futures by imagining and developing alternative scenarios and identifying the steps needed to achieve a preferred sustainable future
		3.2 Adaptability	To manage transitions and challenges in complex sustainability situations and make decisions related to the future in the face of uncertainty, ambiguity and risk.
	x	3.3 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		
	x	4.1 Political agency	To navigate the political system, identify political responsibility and accountability for unsustainable behaviour, and demand effective policies for sustainability.
	x	4.2 Collective action	To act for change in collaboration with others.
	x	4.3 Individual initiative	To identify own potential for sustainability and to actively contribute to improving prospects for the community and the planet.



LTP 3 Environmental Education and sustainability

The LTP approaches sustainability and environmental education and is organized in four units, based on a common theme: 'One Earth.' Each unit aligns with one of the Sustainable Development Goals (SDGs). In each unit different educational resources and pedagogical approaches are employed to foster primary school students' knowledge and the essential competencies related to sustainability. The aim is to enable them to take actions to protect biodiversity, promote the responsible use of water, encourage sustainable consumption and save energy.

Unit 1 Introduction to Sustainability and Environmental Education presents activities as introduction for the main concepts of the topic. Unit 1 content is oriented for teachers. Teachers exploring sustainability and environmental education can have a profound impact on students and society as a whole. Exploring environmental education is crucial for teachers because it addresses a range of issues that impact the planet, society, and individual. Teaching sustainability fosters a sense of global citizenship. Students become aware of their role in a global community and the interconnectedness of environmental issues worldwide. This awareness encourages a sense of responsibility and encourages actions that consider the well-being of the planet and its inhabitants.

Unit 2 One Earth: My Actions to Protect Biodiversity focuses on the SDG 15 | Life on Land. The SDG 15 main purposes are to protect, restore, and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.

Unit 3 One Earth: My Actions to Protect Water also invites to discuss and reflect on practices which aim is to develop the primary school students' understanding about water being part of complex global interrelationships and systems. Different situations to stimulate the primary school reasoning about the Earth' water amount, how water is distributed and how water is used in different cultural contexts are going to be presented.

Unit 4 One Earth: My Actions for Energy Saving aims to improve students' understanding of the concept of energy, the distinction between non-renewable energy resources and renewable energy resources. The objective is to better understand how small individual choices for a more sustainable lifestyle can have an impact on saving energy and contribute to the adoption of energy-saving behaviours.

The materials aim to give ideas to bring them into teacher education and schools and can be adapted for various contexts and enriched further. Every Unit finishes with a [Follow-Up Activity](#) for teachers to reflect on their practice in view of integrating the topic of sustainability into their practice, and includes [TAP-TS Roadmap](#) that can be seen as a visualisation of materials design, and a [Template](#) for developing teaching and learning materials with guiding questions.

Pedagogical Approach

The pedagogical approach of this unit is action-oriented learning. Starting from questioning, teachers are encouraged to research and carry out activities (hands-on and minds-on), to research information, answers and explanations for the situations or processes under analysis, eventually leading to new questions and new explorations. Through collective discussions, teachers are going to reflect about their practices on sustainability and environmental education. Reflect about students learning in activities based on sustainability and environmental education is a powerful way for teachers to enhance the learning experience about both issues. In this unit teachers will be invited to design activities that bridge the gap between classroom concepts and practical applications, reinforcing the relevance of environmental education in everyday life.



Environmental Education: Background information

The aim of this Unit is to provide teachers and student teachers situations to reflect around sustainability and environmental education. Teachers and future teachers who explore environmental education can contribute to building a sustainable future. Furthermore, environmental education provides a tangible context for various academic subjects. Teachers can connect science, geography, social studies, and even mathematics to real-world environmental challenges, making learning more engaging and relevant for students. Teachers exploring environmental education provide students with opportunities to analyze environmental challenges, think critically about potential solutions, and develop problem-solving skills applicable to various aspects of life. By imparting knowledge about sustainable practices, teachers can empower students to make informed decisions that reduce their environmental impact.

UNIT 1. Introduction to Sustainability and Environmental Education					
Main Topic	Target Group	Duration	Knowledge Area/ Subjects in School	Activities	Suggestions for Possible assessment
Introduction to sustainability & environmental educational	Pre- and in-service teachers	Min 300 min	Knowledge area: <ul style="list-style-type: none"> • Environmental education • STEAM subjects • Citizenship education 	<p>Start-up: Activity 1. Connections of Sustainable Development Goals with environmental education</p> <p>Development: Activity 2. The core concepts of sustainability education Activity 3. My actions My handprint Activity 4. Example of STEAM approach for Sustainability & Environmental Education</p> <p>Consolidation: Activity 5. Reflection about biodiversity, water and energy</p> <p>Follow up: Activity 6. Reflection about teacher practice</p>	Teachers' self-reflection



Intended Learning Outcomes	<p>Having worked through the activities and materials, teachers will be able to:</p> <ul style="list-style-type: none"> ✓ Demonstrate an understanding of the United Nations Sustainable Development Goals (SDGs) and their interrelated nature, showcasing the ability to analyze, articulate, and propose solutions for global challenges in areas such as poverty, climate action, and social justice. ✓ Understand the relations between environmental education, sustainability educations and education for sustainable development ✓ Acquire a foundational understanding of specific sustainability themes, related with biodiversity, water and energy. ✓ Reflect about teacher practice and how to positively impacting student learning outcomes and sustainability competences development. 	
Prior Competencies	Teacher previous experiences with practices related with environmental education is recommended, but not mandatory.	
Required materials	<ul style="list-style-type: none"> • Worksheets • Construction blocks • Laptops and smartphones • Single-use plastic items cards 	
Cooperation/ Networking	Not applicable	
Practical Notes for Teachers	This unit is based on teacher discussion with peers.	
Addressing GreenComp	Embodying sustainability values	
	x	1.1 Valuing sustainability To reflect on personal values; identify and explain how values vary among people and over time, while critically evaluating how they align with sustainability values.
		1.2 Supporting fairness To support equity and justice for current and future generations and learn from previous generations for sustainability.
	x	1.3 Promoting nature To acknowledge that humans are part of nature; and to respect the needs and rights of other species and of nature itself in order to restore and regenerate healthy and resilient ecosystems.
	Embracing complexity in sustainability	
		2.1 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.
	x	2.2 Critical thinking To assess information and arguments*, identify assumptions, challenge the status quo, and reflect on how personal, social and cultural backgrounds influence thinking and conclusions.
	x	2.3 Problem framing To formulate current or potential challenges as a sustainability problem in terms of difficulty, people involved, time and geographical scope, in order to identify suitable approaches to anticipating and preventing problems, and to mitigating and adapting to already existing problems.
	Envisioning sustainable futures	
		3.1 Futures literacy To envision alternative sustainable futures by imagining and developing alternative scenarios and identifying the steps needed to achieve a preferred sustainable future
		3.2 Adaptability To manage transitions and challenges in complex sustainability situations and make decisions related to the future in the face of uncertainty, ambiguity and risk.
		3.3 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	
		4.1 Political agency To navigate the political system, identify political responsibility and accountability for unsustainable behaviour, and demand effective policies for sustainability.
	x	4.2 Collective action To act for change in collaboration with others.
x	4.3 Individual initiative To identify own potential for sustainability and to actively contribute to improving prospects for the community and the planet.	

UNIT 2. One Earth: My Actions to Protect Biodiversity

Main Topic	Target Group	Duration	Knowledge Area/ Subjects in School	Activities	Suggestions for Possible assessment
Actions to protect biodiversity	Pre- and in-service teachers, materials are provided for students in school (6-12 y.o.)	Min 300 min	Knowledge area: <ul style="list-style-type: none"> • Environmental education • Science • Mathematics 	<p>Start-up: Activity 1. Biodiversity meaning</p> <p>Development:</p>	Rubric to students evaluate their progress



			<ul style="list-style-type: none"> • (Digital) media education • Citizenship education 	<p>Activity 2. Creation of an ecosystem</p> <p>Activity 3. Biocube</p> <p>Consolidation: Activity 4. Creation of a digital resource about ecosystem protection</p> <p>Follow up: Activity 5. Reflection about primary school students' conceptions about ecosystems</p> <p>Activity 6. Reflection about teacher practice</p>
Intended Learning Outcomes	<p>Having worked through the activities and materials, students will be able to:</p> <ul style="list-style-type: none"> ✓ Understand biodiversity as a fundamental condition of life itself. ✓ Describe the biodiversity of a biocube. ✓ Explain ideas about human actions that condition biodiversity and the importance of protecting biodiversity and ecosystems. 			
Prior Competencies	Optional/ideal: Unit 1. Introduction to sustainability and environmental education.			
Required materials	<ul style="list-style-type: none"> • Papers of three different colours (grey, pink, yellow or others) • Worksheets • Construction blocks • Materials to create the biocube (wooden skewers and tape) • Laptops and smartphones 			
Cooperation/ Networking	<ul style="list-style-type: none"> • Local water treatment facilities. • Local NGOs dedicated to environmental protection 			
Practical Notes for Teachers	Teacher should identify an outdoor location where students can identify different water usages.			
Addressing GreenComp	Embodying sustainability values			
	x	1.1 Valuing sustainability	To reflect on personal values; identify and explain how values vary among people and over time, while critically evaluating how they align with sustainability values.	
		1.2 Supporting fairness	To support equity and justice for current and future generations and learn from previous generations for sustainability.	
	x	1.3 Promoting nature	To acknowledge that humans are part of nature; and to respect the needs and rights of other species and of nature itself in order to restore and regenerate healthy and resilient ecosystems.	
	Embracing complexity in sustainability			
		2.1 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.	
		2.2 Critical thinking	To assess information and arguments*, identify assumptions, challenge the status quo, and reflect on how personal, social and cultural backgrounds influence thinking and conclusions.	
		2.3 Problem framing	To formulate current or potential challenges as a sustainability problem in terms of difficulty, people involved, time and geographical scope, in order to identify suitable approaches to anticipating and preventing problems, and to mitigating and adapting to already existing problems.	
Envisioning sustainable futures				



	3.1 Futures literacy	To envision alternative sustainable futures by imagining and developing alternative scenarios and identifying the steps needed to achieve a preferred sustainable future
	3.2 Adaptability	To manage transitions and challenges in complex sustainability situations and make decisions related to the future in the face of uncertainty, ambiguity and risk.
x	3.3 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		
	4.1 Political agency	To navigate the political system, identify political responsibility and accountability for unsustainable behaviour, and demand effective policies for sustainability.
x	4.2 Collective action	To act for change in collaboration with others.
x	4.3 Individual initiative	To identify own potential for sustainability and to actively contribute to improving prospects for the community and the planet.

UNIT 3. One Earth: My Actions to Protect Water

Main Topic	Target Group	Duration	Knowledge Area/ Subjects in School	Activities	Suggestions for Possible assessment
Actions to protect water	Pre- and in-service teachers, materials are provided for students in school (6-12y.o.)	Min 420 min	Knowledge area: <ul style="list-style-type: none"> • Environmental education • Science • Mathematics • (Digital) media education • Citizenship education 	<p>Start-up: Activity 1. The world's water Activity 2. Water distribution on Earth</p> <p>Development: Activity 3. Water around me Activity 4. My actions to save water</p> <p>Consolidation: Activity 5. Creation of a digital resource about water saving</p> <p>Follow up: Activity 6. Reflection about teacher practice</p>	Rubric to students evaluate their progress
Intended Learning Outcomes	<p>Having worked through the activities and materials, students will be able to:</p> <ul style="list-style-type: none"> ✓ Understand water as a fundamental condition of life itself, the importance of water quality and quantity, and the causes, effects and consequences of water pollution and water scarcity. ✓ Understand that water is part of many different complex global interrelationships and systems. ✓ Communicate about water pollution, water access and water saving measures and to create visibility about success stories. ✓ Save water modifying daily behaviors. 				
Prior Competencies	Optional/ideal: Unit 1. Introduction to sustainability and environmental education.				
Required materials	<ul style="list-style-type: none"> • Paper • Worksheets • Robot and board 				



	<ul style="list-style-type: none"> Model of a house Laptops, tablets or smartphones Scratch game 	
Cooperation/ Networking	<ul style="list-style-type: none"> Local water treatment facilities. Local NGOs dedicated to environmental protection 	
Practical Notes for Teachers	Teacher should identify an outdoor location where students can identify different water usages.	
Addressing GreenComp	Embodying sustainability values	
	x 1.1 Valuing sustainability	To reflect on personal values; identify and explain how values vary among people and over time, while critically evaluating how they align with sustainability values.
	1.2 Supporting fairness	To support equity and justice for current and future generations and learn from previous generations for sustainability.
	x 1.3 Promoting nature	To acknowledge that humans are part of nature; and to respect the needs and rights of other species and of nature itself in order to restore and regenerate healthy and resilient ecosystems.
	Embracing complexity in sustainability	
	2.1 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.
	2.2 Critical thinking	To assess information and arguments*, identify assumptions, challenge the status quo, and reflect on how personal, social and cultural backgrounds influence thinking and conclusions.
	x 2.3 Problem framing	To formulate current or potential challenges as a sustainability problem in terms of difficulty, people involved, time and geographical scope, in order to identify suitable approaches to anticipating and preventing problems, and to mitigating and adapting to already existing problems.
	Envisioning sustainable futures	
	3.1 Futures literacy	To envision alternative sustainable futures by imagining and developing alternative scenarios and identifying the steps needed to achieve a preferred sustainable future
	3.2 Adaptability	To manage transitions and challenges in complex sustainability situations and make decisions related to the future in the face of uncertainty, ambiguity and risk.
	x 3.3 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	
	4.1 Political agency	To navigate the political system, identify political responsibility and accountability for unsustainable behaviour, and demand effective policies for sustainability.
	x 4.2 Collective action	To act for change in collaboration with others.
x 4.3 Individual initiative	To identify own potential for sustainability and to actively contribute to improving prospects for the community and the planet.	

UNIT 4. One Earth: My Actions for Energy Saving

Main Topic	Target Group	Duration	Knowledge Area/ Subjects in School	Activities	Suggestions for Possible assessment
Recognize the human impact on natural resources and act to promote sustainable consumption and production patterns	Pre- and in-service teachers' materials are provided for students in school (6-12y.o.)	Min 420 min	Knowledge area: <ul style="list-style-type: none"> Environmental education STEAM subjects Citizenship education 	Start-Up: Activity 1. What is energy? Activity 2. What are energy sources? Activity 3. What energy sources are used to generate the energy you use? Development: Activity 4. How is energy used at home? Activity 5. What is energy efficiency?	Rubric to students evaluate their progress.



				<p>Activity 6. Is energy accessible to everyone?</p> <p>Activity 7. How does a Wind turbine work? Let's build one!</p> <p>Consolidation: Activity 8. How can we act in the community to promote energy saving?</p> <p>Activity 9. How can I save energy?</p> <p>Follow-up: Activity 10. Reflection about teacher practice</p>
Intended Learning Outcomes	<p>Having worked through the activities and materials, students will be able to:</p> <ul style="list-style-type: none"> ✓ Understand the concept of energy, non-renewable and renewable energetic sources. ✓ Understand the meaning of “energy efficiency” and the utility of “EU energy labels”. ✓ Reflect how energy consumption is related with their individual lifestyle’ choice. ✓ Reflect about “Energy poverty” and understand that access to energy is unequal. ✓ Identify their individual sustainability potential for energy saving and actively contribute to improving community and global perspectives on energy consumption. 			
Prior Competencies	<p>optional/ideal: Unit 1. Introduction to Sustainability and Environmental Education You can also explore LTP 2 Sustainability and Digitality Unit 3</p>			
Required materials	<ul style="list-style-type: none"> ● Laptop or tablet ● Writing materials, worksheets, and interactive presentations. ● Wind turbine - Small hobby motor, 6-12 volts; Red, high-intensity LED; Four craft sticks; Small paper cup for fan blades; Medium cup for base; Hot-glue gun and glue; Scissors (not shown); Drill bit that matches the size of the motor shaft; Fan or windy day. 			
Cooperation/ Networking	<ul style="list-style-type: none"> ● Local environmental NGO’s ● Renewable Energy Communities ● Local renewable energy company ● Children's family and Local Community 			
Practical Notes for Teachers	<p>The estimated time for delivering the tasks of Unit 4 can be adapted by the teacher according to their context and learning objectives. Depending on the age of the primary students, certain materials will have to be adapted. The full pack of activities can be carried out through project work, but teacher can also decide to develop only some of the proposed activities students.</p> <p>The creation of the wind turbine requires the purchase of mini motors with a power of 6-9V and LEDs, which are easily bought online.</p>			
Addressing GreenComp	Embodying sustainability values			
	x	1.1 Valuing sustainability	To reflect on personal values; identify and explain how values vary among people and over time, while critically evaluating how they align with sustainability values.	
		1.2 Supporting fairness	To support equity and justice for current and future generations and learn from previous generations for sustainability.	
	x	1.3 Promoting nature	To acknowledge that humans are part of nature; and to respect the needs and rights of other species and of nature itself in order to restore and regenerate healthy and resilient ecosystems.	



Embracing complexity in sustainability		
	2.1 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.
X	2.2 Critical thinking	To assess information and arguments*, identify assumptions, challenge the status quo, and reflect on how personal, social and cultural backgrounds influence thinking and conclusions.
	2.3 Problem framing	To formulate current or potential challenges as a sustainability problem in terms of difficulty, people involved, time and geographical scope, to identify suitable approaches to anticipating and preventing problems, and to mitigating and adapting to already existing problems.
Envisioning sustainable futures		
	3.1 Futures literacy	To envision alternative sustainable futures by imagining and developing alternative scenarios and identifying the steps needed to achieve a preferred sustainable future
	3.2 Adaptability	To manage transitions and challenges in complex sustainability situations and make decisions related to the future in the face of uncertainty, ambiguity, and risk.
x	3.3 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		
	4.1 Political agency	To navigate the political system, identify political responsibility and accountability for unsustainable behaviour, and demand effective policies for sustainability.
X	4.2 Collective action	To act for change in collaboration with others.
X	4.3 Individual initiative	To identify own potential for sustainability and to actively contribute to improving prospects for the community and the planet.



LTP 4 Climate crisis resilience

This LTP explores an innovative approach to teaching for sustainability and resilience through educational games. It emphasises the transformative potential of gamification in enhancing both teaching and learning experiences related to sustainability, just transition and climate crises. It introduces the concept of gamification as a tool to understand the sustainability and what students can do to become resilient and contribute to the prevention of climate-related disasters. By using gamification and game-based learning, learners are provided with an opportunity to be actively engaged while learning about disaster risks and resilience. At the same time, they are encouraged to enhance their collaborative, problem-solving and creative thinking skills. The LTP is designed to encourage and support teachers and teacher-students to use serious games in their teaching of climate crisis, resilience and other aspects of sustainability. It is structured so that the playful, task-focussed and collaborative learning aspects of learning through gaming are modelled in and through the units – so as to increase pedagogical confidence and ability.

Unit 1 USING SERIOUS GAMES TO TEACH SUSTAINABILITY & RESILIENCE offers an introduction to key pedagogies and the learning possibilities of using ‘serious games’ for education and engagement around sustainability. ‘Serious games’ can be understood as games that focus toward problem-solving and awareness raising rather than entertainment and use features and characteristics of games and game-play to encourage learning and engage the learner in ways that open up challenging and complex issues in a meaningful and non-threatening way. Key elements of engagement such as meaning, ownership, social influence, achievability, challenge, and credibility enhance the success of gamification platforms. The unit explores how these can be incorporated into classroom game designs and activities and so strengthen participants’ learning engagement. Uses explored in the Unit include awareness raising, encouraging action and resilience, and promoting pro-sustainability behaviours.

Unit 2 STOP DISASTERS! USING THE UNDRR GAME AS A LEARNING TOOL FOR DISASTER RISK REDUCTION & RESILIENCE is based around a digital game. The United Nations Office for Disaster Risk Reduction (UNDRR) has the mission of providing leadership and support to governments and organisations around the world who work in disaster risk reduction, with the goal of creating a world where natural disasters do not threaten the wellbeing of people or the future of the planet. As part of their outreach programme, UNDRR worked with game developer *PlayerThree* to create the **Stop Disasters!** game, which helps players learn about the effects of various natural disasters and how these might be prepared for and to some degree mitigated. This Unit focuses on the **Stop Disasters!** flood scenario, which takes place in a fictitious small village of a few hundred people in Eastern/Central Europe. The village is built on a large river which will flood after 20 minutes of game-play (in the Easy scenario) or when manually triggered by the player. The basic idea is that the player – or players working in teams – ‘invest’ a given sum of money in preparing the village for the expected flood. By repeating the scenario a number of times the player or team can learn to improve the outcomes for the village. Further details are provided in the Unit handbook accompanying this Unit.

Unit 3 TEACHING SUSTAINABILITY WITH SCENARIO-BASED LEARNING uses the framework of a scenario with the students engaging in role play. The main narrative behind this activity is the possible building of a holiday resort on an island with a small population and well-preserved nature. The local people discuss this proposal of the authorities and investors. As the decision will have a fundamental impact on the future of young people on the island, the locals would like to have some exchange with young Europeans, and this will be the role of the participants in the game. They students will hear the different views of stakeholders involved or impacted. They will also reflect on scientific resources. At the end of the scenario the participants will do a pitch with the advice they will give about the potential development of the project.



Unit 4 DESIGNING BOARD GAME TO TEACH CLIMATE CRISIS RESILIENCE & SUSTAINABILITY is focused on the design of a board game centred around climate crisis resilience. Through a gamified approach, this unit aims to equip learners with practical skills and knowledge to critically address challenges posed by the climate crisis in their local community or in a setting they know well or can easily relate to and to think about creative ways to solve these challenges. Students are encouraged to find problems in their immediate surroundings related to the climate crisis and to recognize potential solutions that can be implemented to mitigate climate change and build resilience through play and through the building of board games.

Pedagogical Approach

This LTP is designed to encourage and support teachers and teacher-students to use serious games in their teaching relating to climate resilience and other aspects of sustainability. The Units are structured so that aspects can be used either in-person as part of a seminar/workshop or at-distance in the form of a wholly online teacher learning event – depending on the needs of the professional learning context.

The pedagogical approach of integrating serious games and role plays in an educational activity is rooted in the principles of experiential learning and active engagement. By incorporating serious games, learners are immersed in a dynamic and interactive environment that stimulates critical thinking and problem-solving skills. The use of role plays adds a layer of realism, allowing participants to apply theoretical knowledge in practical scenarios. The teaching content is presented in a way that makes abstract and complex concepts more relatable to students, which contributes to better understanding and retention of knowledge.

The need to build resilience and understanding for climate action

Encouraging young people to study issues like resilience and climate action is crucial gives them insights into sustainable living and promotes critical thinking and problem-solving skills. Understanding the interconnected nature of these challenges provides a holistic perspective for making informed decisions. Education on these issues empowers youth people, preparing them for the future with adaptability and sustainability in mind. It also fosters environmental and social responsibility, so shaping a more informed and proactive global citizenry. In summary, engaging with these topics early on equips young individuals to contribute to a sustainable and more resilient world.

UNIT 1. USING SERIOUS GAMES TO TEACH SUSTAINABILITY & RESILIENCE					
Main Topic	Target Group	Duration	Knowledge Area/ Subjects in School	Activities	Possible assessment
Approaching teaching & learning for sustainability through serious games; an introduction.	Teachers / student teachers with an interest in educational gaming as a pedagogical strategy.	Class time: 2 x 45 mins. Learner preparation & follow-out: 8-9 hours	1: Sustainability and climate action. 2: Politics & Society	<u>Activity 1.</u> Defining sustainability <u>Activity 2.</u> Characteristics of a teaching game <u>Activity 3.</u> Game Design <u>Activity 4.</u> Gamemaking	Teacher determined - could include an action project / game making on (un)sustainable



				<i>Activity 5. Reflection on teacher practice</i>	development or climate change.
Intended Learning Outcomes	<p>By working through the activities and materials, students will:</p> <ul style="list-style-type: none"> D2.4/1/LO1: Explore the wholistic nature of strong learning for sustainability in school teaching & learning setting. D2.4/1/LO2: Examine the characteristics of strong games for teaching & learning on sustainability and resilience; to include understanding the range of possibilities and the limitations of using games with young adult learners. D2.4/1/LO3: Develop an understanding of how using and making games can be a valuable way to learn for sustainability and resilience in classroom settings. 				
Prior Competencies	<p>Obligatory:</p> <ul style="list-style-type: none"> No prior competencies required. <p>Optional/ideal:</p> <ul style="list-style-type: none"> Digitally capable of meaningful engagement with lesson materials and sources. Collaboration and cooperation skills to support group activities and agreed solutions. 				
Required materials	<ul style="list-style-type: none"> Access to online prompts for Activity 2 (or downloaded alternative). Access to printouts / digital copies of unit worksheets and resources. 				
Cooperation/ Networking	The unit could facilitate contacts with agencies and organisations with an interest in developing / using educational/ serious games.				
Practical Notes for Teachers	The learning materials and approaches presented in this unit are in four activity blocks directed at learners / participants; timewise, these can easily be adjusted depending on time available and the teaching needs of the group. For example, Activity 3 could easily be extended to fill a full teaching session and Activity 4 could be the source of an individual / collaborative after class challenge or homework assignment. Activity 5 relates to teacher reflection and is intended to facilitate and support teacher learning.				
Addressing GreenComp	Embodying sustainability values				
	X	1.1 Valuing sustainability	To reflect on personal values; identify and explain how values vary among people and over time, while critically evaluating how they align with sustainability values.		
	X	1.2 Supporting fairness	To support equity and justice for current and future generations and learn from previous generations for sustainability.		
	X	1.3 Promoting nature	To acknowledge that humans are part of nature; and to respect the needs and rights of other species and of nature itself in order to restore and regenerate healthy and resilient ecosystems.		
	Embracing complexity in sustainability				
	X	2.1 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.		
	X	2.2 Critical thinking	To assess information and arguments*, identify assumptions, challenge the status quo, and reflect on how personal, social and cultural backgrounds influence thinking and conclusions.		
	X	2.3 Problem framing	To formulate current or potential challenges as a sustainability problem in terms of difficulty, people involved, time and geographical scope, in order to identify suitable approaches to anticipating and preventing problems, and to mitigating and adapting to already existing problems.		
	Envisioning sustainable futures				
	X	3.1 Futures literacy	To envision alternative sustainable futures by imagining and developing alternative scenarios and identifying the steps needed to achieve a preferred sustainable future		
	X	3.2 Adaptability	To manage transitions and challenges in complex sustainability situations and make decisions related to the future in the face of uncertainty, ambiguity and risk.		
	X	3.3 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				
	X	4.1 Political agency	To navigate the political system, identify political responsibility and accountability for unsustainable behaviour, and demand effective policies for sustainability.		
	X	4.2 Collective action	To act for change in collaboration with others.		
X	4.3 Individual initiative	To identify own potential for sustainability and to actively contribute to improving prospects for the community and the planet.			



UNIT 2. STOP DISASTERS! USING THE *UNDRR* GAME AS A LEARNING TOOL FOR DISASTER RISK REDUCTION & RESILIENCE

Main Topic	Target Group	Duration	Knowledge Area/ Subjects in School	Activities	Possible assessment
Using <i>Stop Disasters!</i> to teach Disaster reduction & readiness, and Resilience.	Teachers / student teachers with an interest in educational gaming as a pedagogical strategy.	Class time: 2 or 3 x 45 mins. Learner preparation & follow-out: 8-9 hours	1: Sustainable development. 2: Politics & Society	<u>Activity 1.</u> Group Discussion <u>Activity 2.</u> Playing the Game <u>Activity 3.</u> Reflection <u>Activity 4.</u> Teaching and Learning Challenge <u>Activity 5.</u> <i>Reflection on teacher practice</i>	Teacher determined
Intended Learning Outcomes	<p>Having worked through the activities and materials, students will be able to:</p> <ul style="list-style-type: none"> • D2.4/2/LO1: Plan, teach, and reflect on learning activities /opportunities provided for students by using <i>Stop Disasters!</i> in a teaching & learning setting. • D2.4/2/LO2: Use <i>Stop Disasters!</i> meaningfully within teaching & learning settings; to include understanding the range of possibilities and the limitations of using the game with young adult learners. • D2.4/2/LO3: Develop context-specific extensions and supplementary materials to accommodate diverse learner-needs when teaching with <i>Stop Disasters!</i> 				
Prior Competencies	<p>Obligatory:</p> <ul style="list-style-type: none"> • No prior competencies required. <p>Optional/ideal:</p> <ul style="list-style-type: none"> • Digitally literate to a level that allows meaningful engagement with <i>Stop Disasters!</i> online support materials. • Collaboration and cooperation skills to support group activities and agreed solutions. 				
Required materials	<p>Group-level access to the <i>Stop Disasters!</i> Game on the UNDRR platform: https://www.stopdisastersgame.org/</p> <ul style="list-style-type: none"> • Digital projector / interactive board with good broadband connection. • Access to the TAP-TS <i>Stop Disasters!</i> Handbook and other resources. 				
Cooperation/ Networking	<p>The unit could facilitate contacts with agencies and organisations with a brief in DRR and societal resilience such as UNDRR or DG-ECHO as well as more local bodies involved in flood preparation and education like Civil Defence / Civil Protection Organisations and NGOs.</p>				
Practical Notes for Teachers	<p>The materials as presented below are in four blocks of approx. 60 minutes each, but this can easily be adjusted depending on time available at the discretion of the teacher. Examples of teachers' individual adjustments can be found relatively easily through online searches. These would include, for instance, the way that Amanda Rosen suggests to build home preparation and follow through into the use of the game [https://activelearningps.com/2012/08/02/online-educational-games-natural-disaster-preparation-with-stop-disasters/], or using the various worksheets and resources located through a search. Useful materials including worksheets by Mike Farley can be found here: http://mrsmoorekhs.weebly.com/uploads/2/2/4/6/22468214/2008-monograph-stop-disasters-simulation.pdf</p>				



Note: many of these may have old timestamps and/ or older http-type URLs as Stop Disasters! has been around for a considerable amount of time.		
Addressing GreenComp	Embodying sustainability values	
	X	1.1 Valuing sustainability To reflect on personal values; identify and explain how values vary among people and over time, while critically evaluating how they align with sustainability values.
	X	1.2 Supporting fairness To support equity and justice for current and future generations and learn from previous generations for sustainability.
	X	1.3 Promoting nature To acknowledge that humans are part of nature; and to respect the needs and rights of other species and of nature itself in order to restore and regenerate healthy and resilient ecosystems.
	Embracing complexity in sustainability	
	X	2.1 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.
	X	2.2 Critical thinking To assess information and arguments*, identify assumptions, challenge the status quo, and reflect on how personal, social and cultural backgrounds influence thinking and conclusions.
	X	2.3 Problem framing To formulate current or potential challenges as a sustainability problem in terms of difficulty, people involved, time and geographical scope, in order to identify suitable approaches to anticipating and preventing problems, and to mitigating and adapting to already existing problems.
	Envisioning sustainable futures	
	X	3.1 Futures literacy To envision alternative sustainable futures by imagining and developing alternative scenarios and identifying the steps needed to achieve a preferred sustainable future
	X	3.2 Adaptability To manage transitions and challenges in complex sustainability situations and make decisions related to the future in the face of uncertainty, ambiguity and risk.
	X	3.3 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	
	X	4.1 Political agency To navigate the political system, identify political responsibility and accountability for unsustainable behaviour, and demand effective policies for sustainability.
	X	4.2 Collective action To act for change in collaboration with others.
X	4.3 Individual initiative To identify own potential for sustainability and to actively contribute to improving prospects for the community and the planet.	

UNIT 3. TEACHING SUSTAINABILITY WITH SCENARIO-BASED LEARNING

Main Topic	Target Group	Duration	Knowledge Area/ Subjects in School	Activities	Suggestions for assessment
Decision making; critical skills development; collaboration; advocacy for sustainability issues	For teachers working with secondary school students	Class time: 2 or 3 x 45 mins. Learner preparation & follow-out: 8-9 hours.	Language – Arts Science	Start-up Warm-Up Development Activity 1: Transport Getting to the island. Activity 2: Meeting Hall Getting to the Meeting Hall Activity 3: Stakeholders Empathise with stakeholders Activity 4: Prepare advice Create pitch Consolidation: Final Pitches Presentation of final advice Follow-up Reflection and Feedback	Assessment is part of the scenario



Intended Learning Outcomes	Working through the activities and materials, students will: <ul style="list-style-type: none"> • D2.4/3/LO1. Experience the complexity of decision making • D2.4/3/LO2. Give a motivated answer to a complex problem • D2.4/3/LO3. Create a consensus with other team members • D2.4/3/LO4. Reflect on personal behaviour regarding sustainability and environmental issues 	
Prior Competencies	The reading and video materials are in English and require a basic to more advanced level of English.	
Required materials	<ul style="list-style-type: none"> • Smartphones and/or laptops • Drafting materials such as pens / markers/paper etc 	
Cooperation/ Networking	<ul style="list-style-type: none"> • Students work in groups of 2 or 4; depending on stage and nature of learning tasks 	
Addressing GreenComp	Embodying sustainability values	
	X	1.1 Valuing sustainability To reflect on personal values; identify and explain how values vary among people and over time, while critically evaluating how they align with sustainability values.
		1.2 Supporting fairness To support equity and justice for current and future generations and learn from previous generations for sustainability.
	X	1.3 Promoting nature To acknowledge that humans are part of nature; and to respect the needs and rights of other species and of nature itself in order to restore and regenerate healthy and resilient ecosystems.
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	X	2.3 Problem framing To formulate current or potential challenges as a sustainability problem in terms of difficulty, people involved, time and geographical scope, in order to identify suitable approaches to anticipating and preventing problems, and to mitigating and adapting to already existing problems.
	Envisioning sustainable futures	
	X	3.1 Futures literacy To envision alternative sustainable futures by imagining and developing alternative scenarios and identifying the steps needed to achieve a preferred sustainable future
		3.2 Adaptability To manage transitions and challenges in complex sustainability situations and make decisions related to the future in the face of uncertainty, ambiguity and risk.
		3.3 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	
		4.1 Political agency To navigate the political system, identify political responsibility and accountability for unsustainable behaviour, and demand effective policies for sustainability.
	4.2 Collective action To act for change in collaboration with others.	
X	4.3 Individual initiative To identify own potential for sustainability and to actively contribute to improving prospects for the community and the planet.	

Unit 4. DESIGNING BOARD GAMES TO TEACH CLIMATE CRISIS RESILIENCE & SUSTAINABILITY

Main Topic	Target Group	Duration	Knowledge Area/ Subjects in School	Activities	Suggestions for assessment
Learning about climate crisis resilience through board game design	Pre-service and In-service teachers for students from secondary schools.	Flexible. Ideally, Class activities across: 3 or 4 x 45 mins. Learner follow-out: 10-12 hours.	Biology Chemistry Ecology Language Arts	Start-up Your experience matters Development Activity 1. Introduction to Game Design Activity 2. Prototype Game Design	Peer feedback in the format 2 stars and a wish, rubrics for summative assessment, peer and



		Game testing & showcasing: 10-12 hours		Activity 3. Game Testing Consolidation. Feedback and Game Redesign Follow-up. Evaluation Reflection on practice	self- assessment
Intended Learning Outcomes	Having worked through the activities and materials, students will be able to:				
	<ul style="list-style-type: none"> • D2.4/4/LO1. Recognize different types of climate challenges in their surroundings. • D2.4/4/LO2. Define possible responses to climate challenges to build up resilience. • D2.4/4/LO3. Create a prototype of a board game and test it. 				
Prior Competences	Optional/ideal: Experience of LT4 Unit 1. Using serious games to teach sustainability & resilience.				
Required materials	Cardboard, markers, pen, paper, index cards, etc., further materials dependent on the board game design, e.g. dice, spinners, etc.				
Cooperation / Networking	Local recycling companies Recycling collection centres				
Addressing GreenComp	Embodying sustainability values				
	x	1.1 Valuing sustainability	To reflect on personal values; identify and explain how values vary among people and over time, while critically evaluating how they align with sustainability values.		
	x	1.2 Supporting fairness	To support equity and justice for current and future generations and learn from previous generations for sustainability.		
	x	1.3 Promoting nature	To acknowledge that humans are part of nature; and to respect the needs and rights of other species and of nature itself in order to restore and regenerate healthy and resilient ecosystems.		
	Embracing complexity in sustainability				
	x	2.1 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.		
	x	2.2 Critical thinking	To assess information and arguments*, identify assumptions, challenge the status quo, and reflect on how personal, social and cultural backgrounds influence thinking and conclusions.		
	x	2.3 Problem framing	To formulate current or potential challenges as a sustainability problem in terms of difficulty, people involved, time and geographical scope, in order to identify suitable approaches to anticipating and preventing problems, and to mitigating and adapting to already existing problems.		
	Envisioning sustainable futures				
	x	3.1 Futures literacy	To envision alternative sustainable futures by imagining and developing alternative scenarios and identifying the steps needed to achieve a preferred sustainable future		
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	x	3.3 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				
	x	4.1 Political agency	To navigate the political system, identify political responsibility and accountability for unsustainable behaviour, and demand effective policies for sustainability.		
	x	4.2 Collective action	To act for change in collaboration with others.		
	x	4.3 Individual initiative	To identify own potential for sustainability and to actively contribute to improving prospects for the community and the planet.		



LTP 5. Understanding Climate Change - What the Evidence Says

The LTP introduces the topic of climate disinformation and brings an understanding of the “Media Landscape” in which Disinformation can emerge. It brings into discussion the roles of the media, and which activities of the media make traditional/social media more susceptible to mis-/disinformation. It also presents a range of material and associated pedagogies that explore secondary teaching and learning related to climate and climate information.

Unit 1 Information and Disinformation deals with teaching learners how to evaluate the credibility of sources and understand the nature of climate information and disinformation. It introduces sources to use to develop skills to identify disinformation and respond critically. The unit also explores tools and sources to engage with accurate, science-based climate information. Through this unit, hands-on activities and learning opportunities are emphasised.

Unit 2 Distinguishing between Disinformation & Misinformation addresses the challenge of distinguishing between climate misinformation and disinformation, and opens up a better understanding of the media landscape in which dis-/misinformation can emerge. It discusses the roles of social media in this, and considers what makes social media more susceptible to inaccurate information. Learners are presented with distinguishing terminology and gain the ability to identify inaccurate information. Within this unit, learners engage with examples of inaccurate information through knowledge based, active learning tasks. Investigation and teamwork activities allow for discussion of the role of media in relation to inaccurate information.

Unit 3 The Dangers of Disinformation looks at the dangers of disinformation. It deals with identifying the detrimental effects that misinformation can have on a society. This unit offers content that helps teachers present the knowledge that students require to identify the dangers of disinformation. Through this unit activities and learning opportunities are offered to aid educators in teaching this area.

Unit 4 What Can We do to Challenge Climate Disinformation deals with guiding learners to describe disinformation threats globally and to consider these in terms of understanding of how they can impact environment, society and economy aspects of our lives. The unit explores a range of climate change events across Europe and their effects on people and places. Within this unit learners develop their critical thinking skills and move towards an activism-based approach to countering and mitigating inaccurate information.

Pedagogical Approach

This Learning and Teaching package encourages teachers to explore areas of social media and news resources that young individuals have access to. LTP 5 Units allow for educators and students to engage with active learning pedagogy and support knowledge-based understanding of climate information and how it can be misrepresented. The main pedagogical approaches include reflection, collaboration and technology assisted problem solving.

Unit 1 emphasises how having a better understanding of correct information provided via scientific sources and trusted media can help engage and challenge mis/disinformation. The pedagogical approach is focused on active and participatory learning.

Unit 2 attempts to enable students to have a better understanding of the information that is provided via news agents and social media. The pedagogical approach is focused on active learning for not just educators but also for the secondary school students that will be utilizing these activities.

Unit 3 attempts to enable students to have a better understanding of the information that is provided via scientific sources and media. The pedagogical approach is focused on active learning for not just educators but also for the secondary school students that will be utilizing these activities.

Unit 4 emphasises how having a better understanding of correct information provided via scientific sources and trusted media can help engage and challenge mis/disinformation. This is addressed through active and participatory learning.



The value of understanding information and dis/misinformation

Reliable information is essential for young people to address climate change and sustainability. It fosters awareness, inspires action, and supports informed decision-making. It also enables us to advocate for solutions and adopt sustainable practices. Accurate information builds critical thinking, promotes trust in science, and empowers long-term efforts to tackle environmental challenges. In contrast, incorrect/flawed information poses significant dangers. It creates confusion, undermines trust in science, and leads to poor decisions. Mis- / disinformation also spreads cynicism, diverts attention from urgent issues, and amplifies polarization. The news-reliance of many young people on social media opens up challenges in relation to political agendas and pseudo-experts who exploit these issues, making it crucial to combat false narratives. To counter misinformation, young people need better media literacy, fact-checking skills, and access to trustworthy information sources. By encouraging young people to counter misinformation by emphasising accurate information flows through social media, peer education, and advocacy, we can encourage the fight against fake news and help promote a more sustainable future for themselves and the planet.

UNIT 1 Information and Disinformation					
Main Topic	Target Group	Duration	Knowledge Area/ Subjects in School	Activities	Possible assessment
An educators' resource for building teaching sustainability competence Introduction to key concepts	Secondary school teachers and student teachers via activities for secondary level students	80 Minutes	Information and disinformation and Climate Change	Start Up Activity 1 Information types and uses. Development Activity 2 Exploring the nature of disinformation Consolidation Activity 3 Identifying climate Disinformation Follow-Up Activity 4 Learner reflection & action on disinformation. Reflection Activity 5 Teacher Reflection.	Self-reflection and targeted assignment.
Intended Learning Outcomes	Having worked through the activities and materials, students will be able to: ✓ differentiate between information, misinformation and disinformation; ✓ better evaluate the credibility of online sources; ✓ exercise skill in identifying disinformation and responding critically; ✓ name tools and sources that engage with accurate, science-based climate information.				
Prior Competencies	<ul style="list-style-type: none"> Digitally literate to a level that allows to engage meaningfully with the materials provided in this unit. 				



	<ul style="list-style-type: none"> No basic content competencies needed; basic level of understanding embedded in Unit Ability to collaborate and be cooperated to support group activities and have autonomy to participate. 	
Required material	• Access to internet • Paper and writing materials • Resources as referenced	
Cooperation/ Networking	Exploring and connecting to accurate and science-based sources of information on climate change and just transition.	
Practical Notes for Teachers	Make copies of the supporting Resources available for both group activities and individual future reference. Check availability of online sites /sources ahead of class activities.	
Addressing GreenComp	Embodying sustainability values	
	x 1.1 Valuing sustainability	To reflect on personal values; identify and explain how values vary among people and over time, while critically evaluating how they align with sustainability values.
	x 1.2 Supporting fairness	To support equity and justice for current and future generations and learn from previous generations for sustainability.
	1.3 Promoting nature	To acknowledge that humans are part of nature; and to respect the needs and rights of other species and of nature itself in order to restore and regenerate healthy and resilient ecosystems.
	Embracing complexity in sustainability	
	x 2.1 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.
	x 2.2 Critical thinking	To assess information and arguments*, identify assumptions, challenge the status quo, and reflect on how personal, social and cultural backgrounds influence thinking and conclusions.
	2.3 Problem framing	To formulate current or potential challenges as a sustainability problem in terms of difficulty, people involved, time and geographical scope, in order to identify suitable approaches to anticipating and preventing problems, and to mitigating and adapting to already existing problems.
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	X 3.1 Futures literacy	To envision alternative sustainable futures by imagining and developing alternative scenarios and identifying the steps needed to achieve a preferred sustainable future
	X 3.2 Adaptability	To manage transitions and challenges in complex sustainability situations and make decisions related to the future in the face of uncertainty, ambiguity and risk.
	X 3.3 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	
	X 4.1 Political agency	To navigate the political system, identify political responsibility and accountability for unsustainable behaviour, and demand effective policies for sustainability.
	X 4.2 Collective action	To act for change in collaboration with others.
x 4.3 Individual initiative	To identify own potential for sustainability and to actively contribute to improving prospects for the community and the planet.	

UNIT 2 Distinguishing between Disinformation & Misinformation

Main Topic	Target Group	Duration	Knowledge Area/ Subjects in School	Activities	Possible assessment
Distinguishing between disinformation and misinformation	Secondary school teachers and student teachers with activities for secondary level students	110 – 130 Minutes	Social media Climate change	Start Up Activity 1. Definitions and misunderstanding Development Activity 2. How the media present climate disaster Consolidation Activity 3. Case Study on social media Disinformation Follow-Up Activity 4. Identifying patterns in inaccurate climate	Self reflection questions, Teacher determined



				information; disinformation Tweets Activity 5 . Reflection on teacher practice																																					
Intended Learning Outcomes	Having worked through the activities and materials, students will be able to: ✓ Describe some climate misinformation & disinformation threats. ✓ Describe their understanding of inaccurate information in relation to environment, society and economy. ✓ Describe the impacts that disinformation spread in the aftermath of the climate-related disaster can have.																																								
Prior Competencies	<ul style="list-style-type: none"> • No basic competencies needed, Basic level of understanding preferred: • Ability to collaborate and be cooperated to support group activities and have autonomy to participate. Digitally literate to a level that allows to engage meaningfully with the materials provided in this unit. 																																								
Required materials	<ul style="list-style-type: none"> • Laptop and access to internet • Paper and writing materials 																																								
Cooperation/ Networking	Exploring and connecting to victims of climate disaster and community organizations related to climate disasters																																								
Practical Notes for Teachers	Educators should be aware that different groups of people may cause activities to be longer or shorter. Materials can vary depending on if the event is online or in person.																																								
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UNIT 3. Dangers of Disinformation																																									
Main Topic	Target Group	Duration	Knowledge Area/ Subjects in School	Activities	Possible assessment																																				
Dangers and Risks of Disinformation	Secondary school teachers and student teachers via activities for secondary level students	130 – 150 Minutes	Climate Change	Start Up Activity 1 What is the difference between Weather and Climate? Development	Self-reflection questions, Cloze tests & Assessment Quiz.																																				



				<p>Activity 2 Possible effects of climate change</p> <p>Consolidation</p> <p>Activity 3 Spread of Disinformation</p> <p>Follow-Up</p> <p>Activity 4 Learner reflection & carbon usage.</p> <p>Reflection</p> <p>Activity 5 Teacher Reflection.</p>
Intended Learning Outcomes	<p>Having worked through the activities and materials, students will be able to:</p> <ul style="list-style-type: none"> ✓ Differentiate between weather and climate. ✓ Explain why climate change is happening. ✓ Describe how climate change is affecting our world. ✓ Describe a range of climate change events across Europe and their effects on the people who live there e.g. Valentia Spain 2024. 			
Prior Competencies	<ul style="list-style-type: none"> • Digitally literate to a level that allows to engage meaningfully with the materials provided in this unit • No basic content competencies needed, basic level of understanding proffered • Ability to collaborate and be cooperated to support group activities and have autonomy to participate. 			
Required materials	<ul style="list-style-type: none"> • Laptop and access to internet • Paper and writing materials 			
Cooperation/ Networking	Exploring and connecting to victims of climate disaster and community organizations related to climate disasters and sustainability education.			
Practical Notes for Teachers	<p>Grouping participants differently may cause activities to become longer or shorter. Materials can vary depending on whether the activities are online or in person.</p> <p>The materials on Carbon Footprint can be further explored in LTP 2 Digitality and Sustainability Unit 3.</p>			
Addressing GreenComp	Embodying sustainability values			
	x	1.1 Valuing sustainability	To reflect on personal values; identify and explain how values vary among people and over time, while critically evaluating how they align with sustainability values.	
	x	1.2 Supporting fairness	To support equity and justice for current and future generations and learn from previous generations for sustainability.	
	x	1.3 Promoting nature	To acknowledge that humans are part of nature; and to respect the needs and rights of other species and of nature itself in order to restore and regenerate healthy and resilient ecosystems.	
	Embracing complexity in sustainability			
	x	2.1 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.	
	x	2.2 Critical thinking	To assess information and arguments*, identify assumptions, challenge the status quo, and reflect on how personal, social and cultural backgrounds influence thinking and conclusions.	
	x	2.3 Problem framing	To formulate current or potential challenges as a sustainability problem in terms of difficulty, people involved, time and geographical scope, in order to identify suitable approaches to anticipating and preventing problems, and to mitigating and adapting to already existing problems.	
	Envisioning sustainable futures			
	x	3.1 Futures literacy	To envision alternative sustainable futures by imagining and developing alternative scenarios and identifying the steps needed to achieve a preferred sustainable future	
		3.2 Adaptability	To manage transitions and challenges in complex sustainability situations and make decisions related to the future in the face of uncertainty, ambiguity and risk.	
	x	3.3 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			
		4.1 Political agency	To navigate the political system, identify political responsibility and accountability for unsustainable behaviour, and demand effective policies for sustainability.	
x	4.2 Collective action	To act for change in collaboration with others.		



	x	4.3 Individual initiative	To identify own potential for sustainability and to actively contribute to improving prospects for the community and the planet.		
UNIT 4. How Can We Challenge Climate Disinformation?					
Main Topic	Target Group	Duration	Knowledge Area/ Subjects in School	Activities	Possible assessment
An educators' resource for building teaching sustainability competence to challenge climate disinformation	Secondary school teachers and student teachers with activities for secondary level students	200-220 Minutes	Social media Climate change Sustainability	<p>Start Up <u>Activity 1.</u> Using Social Media to combat climate disinformation</p> <p>Development <u>Activity 2</u> Creating a storyboard for an educational short video</p> <p>Consolidation <u>Activity 3a.</u> Creating a short video <u>Activity 3b</u> Creating a poster</p> <p>Follow-Up <u>Activity 4</u> Poster Activism <u>Activity 5</u> Reflection on Teacher Practice</p>	Peer assessed; Teacher determined
Intended Learning Outcomes	<p>Having worked through the activities and materials, students will be able to:</p> <ul style="list-style-type: none"> ✓ better understand disinformation threats in relation to people worldwide. ✓ envision a more hopeful future regarding information flows concerning climate, environment, society and economy. ✓ more competently engage in navigating and mitigating inaccurate information. 				
Prior Competencies	<ul style="list-style-type: none"> • Basic understanding of climate crisis information / disinformation required (ideally acquired through previous Units in this LTP). • Digitally literate to a level that allows to engage meaningfully with the materials provided in this unit. • Ability to collaborate and be cooperated to support group activities and exercise autonomy to participate. 				
Required materials	<ul style="list-style-type: none"> • Laptop and access to internet • Paper and writing materials • Resources as referenced 				
Cooperation/ Networking	Exploring and connecting to victims of climate disaster and community organizations related to climate disasters.				
Practical Notes for Teachers	<p>Grouping participants differently may cause activities to become longer or shorter. Outcomes and outputs can vary depending on whether the activities are online or in person and the capabilities / interest of the learners.</p> <p>NB: Activities relating to learning with these materials / resources need to be considered in light of school-level policies / practices on the use of technology in learning settings.</p>				
	Embodying sustainability values				



Addressing GreenComp	x	1.1 Valuing sustainability	To reflect on personal values; identify and explain how values vary among people and over time, while critically evaluating how they align with sustainability values.	
	X	1.2 Supporting fairness	To support equity and justice for current and future generations and learn from previous generations for sustainability.	
	X	1.3 Promoting nature	To acknowledge that humans are part of nature; and to respect the needs and rights of other species and of nature itself in order to restore and regenerate healthy and resilient ecosystems.	
	Embracing complexity in sustainability			
	X	2.1 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.	
	X	2.2 Critical thinking	To assess information and arguments*, identify assumptions, challenge the status quo, and reflect on how personal, social and cultural backgrounds influence thinking and conclusions.	
	X	2.3 Problem framing	To formulate current or potential challenges as a sustainability problem in terms of difficulty, people involved, time and geographical scope, in order to identify suitable approaches to anticipating and preventing problems, and to mitigating and adapting to already existing problems.	
	Envisioning sustainable futures			
	x	3.1 Futures literacy	To envision alternative sustainable futures by imagining and developing alternative scenarios and identifying the steps needed to achieve a preferred sustainable future	
	x	3.2 Adaptability	To manage transitions and challenges in complex sustainability situations and make decisions related to the future in the face of uncertainty, ambiguity and risk.	
	X	3.3 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			
	x	4.1 Political agency	To navigate the political system, identify political responsibility and accountability for unsustainable behaviour, and demand effective policies for sustainability.	
	x	4.2 Collective action	To act for change in collaboration with others.	
	x	4.3 Individual initiative	To identify own potential for sustainability and to actively contribute to improving prospects for the community and the planet.	



LTP 6. Green Citizenship in/for Europe

The Learning and Teaching Package 6 Green Citizenship in/for Europe links learning to the development of healthy responsible communities in and beyond the classroom, and therefore invites to consider the Whole School Approach to engage with sustainability. What it implies is that Green Citizenship education should include partners going beyond educators and extending to headteachers, senior management teams, governors, anyone who has a key role in contributing to the common core of civic education, and of course students as partners in the creation and development of green citizenship education. Therefore, the LTP materials would be relevant for educators, teachers, senior management teams, but also contain materials for students as key partners in the process. The participants will multiply the experience and knowledge not only theoretically but also practically through concrete project activities or interventions. In the area of emotions, participants become sensitive to the principles of sustainable development, they identify with them. In the area of action, the participants reflect on the active approach to the implementation of sustainable development both in school life and outside school life in the sense of green citizenship.

Unit 1 Introduction to Whole School Approach and Green Citizenship Education is understood as an introduction to the topic of Whole School Approach to sustainability and Green Citizenship. Through the Living Spiral Framework, it invites to start with thinking about present institutional practices for sustainability (roots), explore various small actions and do-able changes through transformative learning (shoots), that can lead to new processes (stems) and continue over time (leaves), and give seeds to new initiatives. Mainly, this unit presents practical ideas for green citizenship, and empowerment of young children to become agents for change, in particular through whole school approach. The participants familiarise themselves with the individual project phases and apply these in daily practice in order to set the process of 'sustainability' and 'education for sustainable development' in motion at their school / institution. The Unit finishes with a Follow-Up Activity for teachers to reflect on their practice in view of integrating the Whole School Approach (WSA) for Green Citizenship.

Unit 2 Mosaic Game aims to engage with the idea that it takes the whole school community to work together towards improvements. Mosaic Game serves as an innovative teaching and learning tool to support WSA for sustainability by fostering collaboration and critical thinking among students and staff. Through the game, participants are challenged to explore and solve sustainability-related problems, where collective decision-making is essential. This approach integrates across subjects, engaging students in hands-on learning while encouraging reflection on sustainability of their local environment. By involving the entire school community in the game—teachers, students, non-teaching staff, and even parents—the Mosaic Game amplifies awareness of sustainability issues and empowers participants to develop actionable solutions that benefit not just the school but the wider community. This aligns perfectly with the WSA, which seeks to embed sustainability as a core value across every aspect of school life, creating a more environmentally conscious and engaged community.

Unit 3 'Places Of Learning And Resources' (POLAR) for sustainability' engages participants with the pedagogical possibilities of POLAR, outside of schools, for sustainability education. The unit is aimed at secondary level teachers and student teachers from across subjects, and works particularly well in interdisciplinary groups. The unit begins with an exploration and/or recap of sustainability education, as the basis for participants identifying connections between their instructional subjects and sustainability education. Next, participants explore a POLAR, and take from this inspiration to develop their own pre, while and post POLAR activities. After this, participants identify a POLAR of choice develop activities and guide peers. Finally, participants share learning from the unit as the basis for their future use of POLAR for sustainability education.



Pedagogical Approach

A whole school approach to sustainability seeks to embed learning for environmental sustainability across the institution. It adopts a systemic view of education creating opportunities for living and learning sustainability across the educational environments ([Working Group Input Paper](#)). There are a number of contributing factors to the success of a whole school approach, such as a whole-school plan, future-oriented perspective, students getting hands on experiences and development of critical enquiry and systems thinking, and distributed leadership where dialogic communication is paramount. Thus, the LTP units engage in reflecting on institutional practices with the prospect to transform them, and gives ideas for projects to engage all actors actively in examining how the local environment (school) could be improved; in reflecting on forms of communication about sustainable ideas for the future.

The pedagogy of POLAR is rooted in experiential interdisciplinary collaborative inquiry-driven approaches. These methods emphasize hands-on experiences, real-world problem-solving, and learning in diverse environments beyond the traditional classroom, which enhances students' understanding of sustainability in a more meaningful and immersive way.

Green Citizenship in/for Europe: Background information

Green Citizenship in Europe is an emerging concept that emphasizes the responsibility of individuals, communities, and institutions to act as stewards of the environment. Rooted in the ideals of sustainability, social justice, and democratic participation, it calls for active engagement in addressing the ecological challenges that Europe faces, such as climate change, biodiversity loss, and resource depletion. Green Citizenship promotes not only the reduction of one's ecological footprint through sustainable living but also advocacy for systemic change at the policy level. In the European context, it aligns with the European Union's Green Deal, which aims to make Europe the first climate-neutral continent by 2050. This theme encourages students to explore their roles as empowered citizens who can influence environmental outcomes through their choices, activism, and collaboration within their communities, contributing to a greener, more resilient Europe.

UNIT 1. INTRODUCTION TO WSA AND GSE					
Main Topic	Target Group	Duration	Knowledge Area/ Subjects in School	Activities	Possible assessment
Introduction in the topic of Whole School Approach in the context of sustainability and Green Citizenship	School management, school development teams (teachers, pupils, parents), multipliers, pre- and in-servis teachers	210 min. <i>(not including project work)</i>	Sustainability, Education for sustainable development	Start-up Activity 1. Learning Environment Development Activity 2. Green Citizenship Model Activity 3. A Whole School Approach as a Pedagogical Approach for Green Citizenship Consolidation	Project work



				Activity 4. Taking Action in a school or wider Community Follow-up Activity 5. Join a bigger community of Green Citizens Activity 6. Reflect on the application of WSA approach.
Intended Learning Outcomes	Having worked through the activities and materials, students will be able to: <ul style="list-style-type: none"> GreenCompFramework(GCF) 1.1: Participants reflect on their personal values and how they align with sustainability values GCF 2.1: The participants look at the concept of sustainability from all sides and understand the sustainable functioning of the school as a complex system. GCF 2.2: Participants acquire knowledge about the concept of sustainability and the Whole School Approach and position themselves in relation to it. GCF 2.3: Participants will recognize the complexity of the challenge of implementing Whole School Approaches GCF 3.1: Participants visualize the sustainable school of the future 			
Prior Competencies	optional/ideal: Sustainability, Education for sustainable development			
Required materials	<ul style="list-style-type: none"> on site: flipchart, presentation kit, laptop, projector, pens, writing pads Digital: online room, collaborative tool GreenCompFramework (pdf) 			
Cooperation/ Networking	Networking with the wider communities			
Addressing GreenComp	Embodying sustainability values			
		1.1 Valuing sustainability	To reflect on personal values; identify and explain how values vary among people and over time, while critically evaluating how they align with sustainability values.	
		1.2 Supporting fairness	To support equity and justice for current and future generations and learn from previous generations for sustainability.	
		1.3 Promoting nature	To acknowledge that humans are part of nature; and to respect the needs and rights of other species and of nature itself in order to restore and regenerate healthy and resilient ecosystems.	
		Embracing complexity in sustainability		
	X	2.1 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.	
	X	2.2 Critical thinking	To assess information and arguments*, identify assumptions, challenge the status quo, and reflect on how personal, social and cultural backgrounds influence thinking and conclusions.	
	X	2.3 Problem framing	To formulate current or potential challenges as a sustainability problem in terms of difficulty, people involved, time and geographical scope, in order to identify suitable approaches to anticipating and preventing problems, and to mitigating and adapting to already existing problems.	
		Envisioning sustainable futures		
	X	3.1 Futures literacy	To envision alternative sustainable futures by imagining and developing alternative scenarios and identifying the steps needed to achieve a preferred sustainable future	
	X	3.2 Adaptability	To manage transitions and challenges in complex sustainability situations and make decisions related to the future in the face of uncertainty, ambiguity and risk.	
	X	3.3 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		
	X	4.1 Political agency	To navigate the political system, identify political responsibility and accountability for unsustainable behaviour, and demand effective policies for sustainability.	
X	4.2 Collective action	To act for change in collaboration with others.		



	x	4.3 Individual initiative	To identify own potential for sustainability and to actively contribute to improving prospects for the community and the planet.		
UNIT 2. WSA FOR GSE: A MOSAIC GAME					
Main Topic	Target Group	Duration	Knowledge Area/ Subjects in School	Activities	Possible assessment
Introduction of the Mosaic Principle for Whole School Approach	School management, school development teams (teachers, pupils, parents), multipliers, pre- and in-service teachers	<i>Without the development of projects:</i> About 180 min. Projects can be different in duration	Across the curriculum	Start-up Activity 1. Mosaic Principle of Sustainability Development Activity 2. Exploration/Discovery Phase Consolidation Activity 3. Mosaic of the School Follow-Up Activity 4. WSA Action Activity 5. Reflect on the application of WSA approach.	Project work
Intended Learning Outcomes	Having worked through the activities and materials, students will be able to: <ul style="list-style-type: none"> GreenCompFramework(GCF) 1.1: Participants reflect on their personal values and how they align with sustainability values GCF 2.1: The participants look at the concept of sustainability from all sides and understand the sustainable functioning of the school as a complex system. GCF 2.2: Participants acquire knowledge about the concept of sustainability and the Whole School Approach and position themselves in relation to it. GCF 2.3: Participants will recognize the complexity of the challenge of implementing Whole School Approaches GCF 3.1: Participants visualize the sustainable school of the future GCF 4.2: Participants plan actions for change in collaboration with others. 				
Prior Competencies	optional/ideal: Sustainability, Education for sustainable development				
Required materials	<ul style="list-style-type: none"> Hexagons (paper); blank puzzle pieces Photocamera; photoprinting GreenCompFramework (pdf) 				
Cooperation/ Networking	Local community; eco-friendly businesses; families, other schools				
Addressing GreenComp	Embodying sustainability values				
		1.1 Valuing sustainability	To reflect on personal values; identify and explain how values vary among people and over time, while critically evaluating how they align with sustainability values.		
		1.2 Supporting fairness	To support equity and justice for current and future generations and learn from previous generations for sustainability.		
		1.3 Promoting nature	To acknowledge that humans are part of nature; and to respect the needs and rights of other species and of nature itself in order to restore and regenerate healthy and resilient ecosystems.		
	Embracing complexity in sustainability				
	x	2.1 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.		
	x	2.2 Critical thinking	To assess information and arguments*, identify assumptions, challenge the status quo, and reflect on how personal, social and cultural backgrounds influence thinking and conclusions.		



X	2.3 Problem framing	To formulate current or potential challenges as a sustainability problem in terms of difficulty, people involved, time and geographical scope, in order to identify suitable approaches to anticipating and preventing problems, and to mitigating and adapting to already existing problems.
x Envisioning sustainable futures		
X	3.1 Futures literacy	To envision alternative sustainable futures by imagining and developing alternative scenarios and identifying the steps needed to achieve a preferred sustainable future
X	3.2 Adaptability	To manage transitions and challenges in complex sustainability situations and make decisions related to the future in the face of uncertainty, ambiguity and risk.
X	3.3 Exploratory thinking	To adopt a relational way of thinking by exploring and linking different disciplines, using creativity and experimentation with novel ideas or methods.
x Acting for sustainability		
X	4.1 Political agency	To navigate the political system, identify political responsibility and accountability for unsustainable behaviour, and demand effective policies for sustainability.
X	4.2 Collective action	To act for change in collaboration with others.
x	4.3 Individual initiative	To identify own potential for sustainability and to actively contribute to improving prospects for the community and the planet.

UNIT 3. PLACES OF LEARNING AND RESOURCES FOR GSE

Main Topic	Target Group	Duration	Knowledge Area/ Subjects in School	Activities	Possible assessment
Introduce the POLAR approach for sustainability education	teachers, student teachers	About 660 min. with project work Projects can be different in duration	Across the curriculum	Start-up Activity 1. What is Green Citizenship Education Development Activity 2. POLAR Exploration Activity 3. POLAR Visit Consolidation Activity 4. POLAR Preparation Follow-Up Activity 5. My POLAR Activity 6. Reflect on the application of POLAR approach.	My POLAR
Intended Learning Outcomes	Having worked through the activities and materials, participants will be able to: 1: Participants understand the concept of Green Citizenship Education from different sides: values, skills, attitudes, methods for teaching and learning. 2: Participants acquire knowledge about an approach to teach sustainability - POLAR 3: Participants recognize the complexity of implementing POLAR 4: Participants plan their POLAR 5: Participants reflect on the experiences				
Prior Competencies	optional/ideal: Education for Sustainability (LTP 1 Unit1) and Green Citizenship in/for Europe (LTP 6 Unit 1)				
Required materials	<ul style="list-style-type: none"> • Flipcharts, markers • Photocamera • GreenCompFramework (pdf) 				



Cooperation/ Networking	Local community; local museums; local farms; local theatre etc.	
Addressing GreenComp	Embodying sustainability values	
	X	1.1 Valuing sustainability To reflect on personal values; identify and explain how values vary among people and over time, while critically evaluating how they align with sustainability values.
		1.2 Supporting fairness To support equity and justice for current and future generations and learn from previous generations for sustainability.
	X	1.3 Promoting nature To acknowledge that humans are part of nature; and to respect the needs and rights of other species and of nature itself in order to restore and regenerate healthy and resilient ecosystems.
	Embracing complexity in sustainability	
	X	2.1 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.
	X	2.2 Critical thinking To assess information and arguments*, identify assumptions, challenge the status quo, and reflect on how personal, social and cultural backgrounds influence thinking and conclusions.
		2.3 Problem framing To formulate current or potential challenges as a sustainability problem in terms of difficulty, people involved, time and geographical scope, in order to identify suitable approaches to anticipating and preventing problems, and to mitigating and adapting to already existing problems.
	Envisioning sustainable futures	
		3.1 Futures literacy To envision alternative sustainable futures by imagining and developing alternative scenarios and identifying the steps needed to achieve a preferred sustainable future
		3.2 Adaptability To manage transitions and challenges in complex sustainability situations and make decisions related to the future in the face of uncertainty, ambiguity and risk.
	X	3.3 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	
		4.1 Political agency To navigate the political system, identify political responsibility and accountability for unsustainable behaviour, and demand effective policies for sustainability.
		4.2 Collective action To act for change in collaboration with others.
	4.3 Individual initiative To identify own potential for sustainability and to actively contribute to improving prospects for the community and the planet.	



LTP 7. Sustainable Entrepreneurship Education

LTP 7 follows a holistic approach by providing background information and methodologies to foster the sustainable entrepreneurship competences of in-service and pre-service teachers. Based on the knowledge, skills and competences acquired by completing this LTP, teachers will be able to develop new teaching materials or adapt already existing ones with aspects of sustainable entrepreneurship education (SEE).

Entrepreneurship education plays a key role in supporting young people to adopt a positive mindset. The entrepreneurial mindset is referred to a certain way of thinking by which young people confront difficulties and problems in life. The entrepreneurial mindset enables young people to overcome those challenges, be decisive and take on responsibilities for any of their behaviours and activities.

Unit 1 - Unit 4 are meant specifically for teacher education offering activities and materials to educate pre-service and in-service teachers around SEE. Unit 5 and Unit 5 Light provide materials, resources and contents for teachers to implement directly in their classrooms. Also, Unit 4 Further Examples could inspire teachers for SEE workshops.

Unit 1 Introduction to SEE provides knowledge-basis around entrepreneurship and sustainability competences supported by focusing questions. This unit aims to reflect on the level of the entrepreneurial mindset of the teachers in a creative and trustful atmosphere.

Unit 2 Self-Reflection engages with values and attitudes towards sustainability and entrepreneurship. This unit raises the awareness of the teachers for fostering their own sustainable and entrepreneurship competences. Through different reflective phases teachers get aware of their motivation to work with these topics and also with the possibilities of interdisciplinary linking the theory (GreenComp, EntreComp) with the practice (own living and teaching environment).

Unit 3 Transfer supports teachers by the transfer of their know-how, values, attitudes, and motivation into the teaching practice. The key focus is to get into action while elaborating ideas on how to connect the sustainable entrepreneurship approach with own teaching subject.

In **Unit 4 Implement** the participants develop their own teaching and learning materials by aligning the learning objectives of their subject(s) with the sustainable entrepreneurship competencies. Furthermore, the participants also elaborate hands on working materials for students and set the assessment methods and tools for the assessment of the learning outcomes. There are examples provided, based on the experiences from TAP-TS events, and CorEDU practice.

Unit 5 A Journey into a More Sustainable City (City of Future) is more practice-based, and would be of interest for student teachers and teachers to implement directly in the classroom. It aims to inspire to develop sustainable entrepreneurship competences among students in an engaging and fun way, while at the same time giving knowledge-basis around key concepts. Students will set on a journey to improve their local surroundings by critically exploring what could be improved and how in their own cities or towns. There are two version provided. One is a more advanced version with the Lego Bricks and technology. Version Light offers alternatives but also engages with the projects in a creative way.



Pedagogical Approach

The pedagogical approach bases on the [TAP-TS Roadmap](#) and aims to enable learners and teachers to think and act sustainably. The elaborated five units within the 7 Learning and Teaching Package (LTP) “Sustainable Entrepreneurship Education” include methodologies and tools to foster the active participation of the pre-service and in-service teachers in the discourse on sustainability and follow a whole-school-approach when it comes to the transfer of the sustainable entrepreneurship approach into their own teaching. The five units furthermore follows a holistic approach while focusing on the competences defined in [the Green Comp Framework](#).

This LTP incorporates activities which are focusing on real life challenges (Unit 1), action-oriented, hands-on and action-oriented (Unit 2, Unit 3, Unit 5) activities, and stimulate creative collaboration between the teachers (Unit 4). Unit 5 also invites teachers and student teachers to try project-based approach following the following line:

1. Problem definition
2. Reflection
3. Business idea

At the end educators who have tried out the materials are invited to reflect on teacher practice at three levels and different dimensions (Follow-Up Activity2).

Sustainable Entrepreneurship Education: Background information

Sustainable entrepreneurship education teaches young people on the one side how to successfully use current resources to achieve sustainable growth while not risking future generations’ ability to access resources. On the other side sustainable entrepreneurship competences enable young people to value sustainability; to support equity and justice for current and future generations; to approach a sustainability problem from all sides, to formulate current and potential challenges in order to identify sustainable approaches to anticipating and preventing problems, and to mitigating and adapting already existing problems. Furthermore, to adopt a relational way of thinking by exploring and linking different disciplines, using creativity and experimentation with novel ideas and methods and to act for change in collaboration with others round up the sustainability competences.



UNIT 1 Introduction “Sustainable entrepreneurship mindset”

Main Topic	Target Group	Duration	Knowledge Area/ Subjects in School	Activities	Suggestion s for Possible assessment
Acquire knowledge about entrepreneurship and sustainability competences	Pre-service and in-service teachers in secondary schools	180 min	Applicable multidisciplinary across different subjects and knowledge areas	Activity 1. Trends and Challenges Activity 2. Competence Frameworks Activity 3. Transfer Activity 4. Exchange	Reflection questions
Intended Learning Outcomes	Having worked through the activities and materials, students will be able to: ✓ describe the core idea behind the GreenComp and EntreComp. ✓ list at least 5 competencies related to the GreenComp and EntreComp. ✓ elaborate first examples for the listed competencies in relation to the daily life.				
Prior Competencies	optional/ideal: no prior competencies required				
Required materials	<ul style="list-style-type: none"> Power Point with Information on the Entrepreneurship Competence Framework and Green Competence Framework flipchart paper, moderation cards, pens 				
Cooperation/Networking	Not applicable				
Practical Notes for Teachers	These materials are recommended for educators who are training pre-service and/or in-service teachers. As this unit aims to reflect the level of the entrepreneurial mindset of the teachers it is important to create a trustful and interactive learning atmosphere.				
Addressing GreenComp	Embodying sustainability values				
	x	1.1 Valuing sustainability	To reflect on personal values; identify and explain how values vary among people and over time, while critically evaluating how they align with sustainability values.		
	x	1.2 Supporting fairness	To support equity and justice for current and future generations and learn from previous generations for sustainability.		
	x	1.3 Promoting nature	To acknowledge that humans are part of nature; and to respect the needs and rights of other species and of nature itself in order to restore and regenerate healthy and resilient ecosystems.		
	Embracing complexity in sustainability				
	x	2.1 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.		
	x	2.2 Critical thinking	To assess information and arguments*, identify assumptions, challenge the status quo, and reflect on how personal, social and cultural backgrounds influence thinking and conclusions.		
	x	2.3 Problem framing	To formulate current or potential challenges as a sustainability problem in terms of difficulty, people involved, time and geographical scope, in order to identify suitable approaches to anticipating and preventing problems, and to mitigating and adapting to already existing problems.		
	Envisioning sustainable futures				
		3.1 Futures literacy	To envision alternative sustainable futures by imagining and developing alternative scenarios and identifying the steps needed to achieve a preferred sustainable future		
	3.2 Adaptability	To manage transitions and challenges in complex sustainability situations and make decisions related to the future in the face of uncertainty, ambiguity and risk.			
x	3.3 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	
	4.1 Political agency	To navigate the political system, identify political responsibility and accountability for unsustainable behaviour, and demand effective policies for sustainability.
	4.2 Collective action	To act for change in collaboration with others.
	4.3 Individual initiative	To identify own potential for sustainability and to actively contribute to improving prospects for the community and the planet.

UNIT 2 Self-reflection “Sustainable entrepreneurship mindset”

Main Topic	Target Group	Duration	Knowledge Area/ Subjects in School	Activities	Suggestions for Possible assessment
Self-reflection on values and attitudes and find out the individual intrinsic motivation	Pre-service and in-service teachers in secondary schools	120 min	Applicable multidisciplinary across different subjects and knowledge areas	Activity 1. Self-reflection Activity 2. Awareness raising Activity 3. Matching Activity 4. Follow-up	Self-reflection sheet Personal ad for „walking gallery” An action plan for further self-growth
Intended Learning Outcomes	Having worked through the activities and materials, students will be able to: <ul style="list-style-type: none"> ✓ describe their own values and attitudes towards sustainability. ✓ describe their own values and attitudes towards entrepreneurship. ✓ demonstrate the intrinsic motivation for fostering their own sustainability and entrepreneurship competences 				
Prior Competencies	obligatory: Successful completion Uni 1 of this LTP optional/ideal: Experience with self-reflection tools				
Required materials	Self-reflection sheet, pen				
Cooperation/ Networking	Not applicable				
Practical Notes for Teachers	This unit raises the awareness of the teachers for fostering their own sustainable and entrepreneurship competences. Through different reflective phases teachers get aware of their motivation to work with these topics and also with the possibilities of interdisciplinary linking the theory (GreenComp, EntreComp) with the practice (own living and teaching environment).				
Addressing GreenComp	Embodying sustainability values				
	x	1.1 Valuing sustainability	To reflect on personal values; identify and explain how values vary among people and over time, while critically evaluating how they align with sustainability values.		
		1.2 Supporting fairness	To support equity and justice for current and future generations and learn from previous generations for sustainability.		
		1.3 Promoting nature	To acknowledge that humans are part of nature; and to respect the needs and rights of other species and of nature itself in order to restore and regenerate healthy and resilient ecosystems.		
	Embracing complexity in sustainability				
		2.1 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.		
	x	2.2 Critical thinking	To assess information and arguments*, identify assumptions, challenge the status quo, and reflect on how personal, social and cultural backgrounds influence thinking and conclusions.		
x	2.3 Problem framing	To formulate current or potential challenges as a sustainability problem in terms of difficulty, people involved, time and geographical scope, in order to identify suitable approaches to anticipating and preventing problems, and to mitigating and adapting to already existing problems.			
Envisioning sustainable futures					



	3.1 Futures literacy	To envision alternative sustainable futures by imagining and developing alternative scenarios and identifying the steps needed to achieve a preferred sustainable future
	3.2 Adaptability	To manage transitions and challenges in complex sustainability situations and make decisions related to the future in the face of uncertainty, ambiguity and risk.
	3.3 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		
	4.1 Political agency	To navigate the political system, identify political responsibility and accountability for unsustainable behaviour, and demand effective policies for sustainability.
x	4.2 Collective action	To act for change in collaboration with others.
x	4.3 Individual initiative	To identify own potential for sustainability and to actively contribute to improving prospects for the community and the planet.

UNIT 3 Transfer “Sustainable entrepreneurship”

Main Topic	Target Group	Duration	Knowledge Area/ Subjects in School	Activities	Possible assessment
First attempt to transfer theory into practice	Pre- and in-service teachers	120 min	Applicable multidisciplinary across different subjects and knowledge areas	Activity1. Brainstorming Activity2. Get into action Activity3. Elaborate learning outcomes Activity4. Follow-up	Reflective questions Presented learning outcomes
Intended Learning Outcomes	Having worked through the activities and materials, students will be able to: <ul style="list-style-type: none"> ✓ define what sustainable entrepreneurship is. ✓ elaborate the relationship between sustainable entrepreneurship and own teaching subject(s). ✓ formulate concrete learning objectives by considering own teaching subject(s) and the sustainable entrepreneurship competences. 				
Prior Competencies	obligatory: successful completion of Uni 1 and Unit 2 of this LTP optional/ideal: In case of non-attendance of Unit 1 and 2 the participant should be aware of their own values, motivation, needs.				
Required materials	Flipchart paper, pen				
Cooperation/ Networking	Not applicable				
Practical Notes for Teachers	This unit supports teachers by the transfer of their know-how, values, attitudes and motivation into the teaching practice. As examples that could support the formulation learning objectives, you can explore Appendix 1 Online Course, and Unit 5 of this LTP				
Addressing GreenComp	Embodying sustainability values				
	x	1.1 Valuing sustainability	To reflect on personal values; identify and explain how values vary among people and over time, while critically evaluating how they align with sustainability values.		
		1.2 Supporting fairness	To support equity and justice for current and future generations and learn from previous generations for sustainability.		
		1.3 Promoting nature	To acknowledge that humans are part of nature; and to respect the needs and rights of other species and of nature itself in order to restore and regenerate healthy and resilient ecosystems.		
	Embracing complexity in sustainability				
		2.1 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.		
		2.2 Critical thinking	To assess information and arguments*, identify assumptions, challenge the status quo, and reflect on how personal, social and cultural backgrounds influence thinking and conclusions.		
		2.3 Problem framing	To formulate current or potential challenges as a sustainability problem in terms of difficulty, people involved, time and geographical scope, in order to identify suitable approaches to anticipating and preventing problems, and to mitigating and adapting to already existing problems.		
	Envisioning sustainable futures				
	x	3.1 Futures literacy	To envision alternative sustainable futures by imagining and developing alternative scenarios and identifying the steps needed to achieve a preferred sustainable future		



x	3.2 Adaptability	To manage transitions and challenges in complex sustainability situations and make decisions related to the future in the face of uncertainty, ambiguity and risk.
x	3.3 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		
	4.1 Political agency	To navigate the political system, identify political responsibility and accountability for unsustainable behaviour, and demand effective policies for sustainability.
x	4.2 Collective action	To act for change in collaboration with others.
x	4.3 Individual initiative	To identify own potential for sustainability and to actively contribute to improving prospects for the community and the planet.

UNIT 4 Implementation “Sustainable Entrepreneurship”

Main Topic	Target Group	Duration	Knowledge Area/ Subjects in School	Activities	Possible assessment
Developing teaching and learning materials	Pre- and in-service teachers	360 min	Applicable multidisciplinary across different subjects and knowledge areas	In retrospect Development Feedback Follow-up	Ready teaching materials, assessment methods and tools
Intended Learning Outcomes	Having worked through the activities and materials, students will be able to: <ul style="list-style-type: none"> ✓ develop at least one teaching unit based on the learning objectives elaborated in Unit 3. ✓ develop related working materials for students. ✓ develop assessment tools for assessing the acquired competences of the students after implementing the teaching unit. 				
Prior Competencies	obligatory: Successfully completing Uni 1, 2 and Unit 3 of this LTP optional/ideal: In case of non-attendance of Unit 1, 2, 3 the participant should have elaborated learning objectives with the focus on own teaching subject(s) and				
Required materials	Flipchart paper, pen				
Cooperation/ Networking	Not applicable				
Practical Notes for Teachers	In this unit the participants develop their own teaching unit by aligning the learning objectives of their subject(s) with the sustainable entrepreneurship competencies. Furthermore, the participants also elaborate hands on working materials for students and set the assessment methods and tools for the assessment of the learning outcomes.				
Addressing GreenComp	Embodying sustainability values				
	x	1.1 Valuing sustainability	To reflect on personal values; identify and explain how values vary among people and over time, while critically evaluating how they align with sustainability values.		
	x	1.2 Supporting fairness	To support equity and justice for current and future generations and learn from previous generations for sustainability.		
	x	1.3 Promoting nature	To acknowledge that humans are part of nature; and to respect the needs and rights of other species and of nature itself in order to restore and regenerate healthy and resilient ecosystems.		
	Embracing complexity in sustainability				
	x	2.1 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.		
	x	2.2 Critical thinking	To assess information and arguments*, identify assumptions, challenge the status quo, and reflect on how personal, social and cultural backgrounds influence thinking and conclusions.		
	x	2.3 Problem framing	To formulate current or potential challenges as a sustainability problem in terms of difficulty, people involved, time and geographical scope, in order to identify suitable approaches to anticipating and preventing problems, and to mitigating and adapting to already existing problems.		
	Envisioning sustainable futures				
	x	3.1 Futures literacy	To envision alternative sustainable futures by imagining and developing alternative scenarios and identifying the steps needed to achieve a preferred sustainable future		
	x	3.2 Adaptability	To manage transitions and challenges in complex sustainability situations and make decisions related to the future in the face of uncertainty, ambiguity and risk.		
x	3.3 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					



x	4.1 Political agency	To navigate the political system, identify political responsibility and accountability for unsustainable behaviour, and demand effective policies for sustainability.
x	4.2 Collective action	To act for change in collaboration with others.
x	4.3 Individual initiative	To identify own potential for sustainability and to actively contribute to improving prospects for the community and the planet.

UNIT 5 A JOURNEY INTO A MORE SUSTAINABLE CITY*

Main Topic	Target Group	Duration	Knowledge Area/ Subjects in School	Activities	Suggestions for Possible assessment
The Unit engages students in developing their sustainable entrepreneurship competences through a fun project game.	Secondary school students	Min 500 min The activities can be played out as a one week project. There can be many adjustments made depending on contexts	Applicable multidisciplinary across different subjects and knowledge area	Start-Up Activity 1. The five-Minute Me/Bingo Development Activity 2. City of the Future/Gallery Walk Consolidation Activity 3. The Post-It Walk/My Sustainable City Activity 4. The Lego City/We Build a Sustainable City Activity 5. Sustainable Business/We are Problem-Solver Follow-Up Activity 1. Reflection on activities for students Activity2. Reflection on teacher practice	Project work
Intended Learning Outcomes	Having worked through the activities and materials, students will be able to: <ul style="list-style-type: none"> ✓ describe at least two entrepreneurship competences. ✓ differentiate among source of information. ✓ describe challenges and potentials of sustainable cities. ✓ reflect the status quo of their own city considering principles of economic, ecological and economic sustainability. ✓ to transfer the observations on status quo from the city walk into a SWOT-Analysis. ✓ to elaborate first ideas for services or products for improvement of the status quo 				
Prior Competencies	optional/ideal: no prior competencies required				
Required materials	Post-it notes, pen, Lego-Kits (brought by students), tools for videorecording				



Cooperation/ Networking	Networking with colleagues teaching business would be recommended. Also, connecting to local sustainable businesses and asking them to be invited experts would enhance the experience.	
Practical Notes for Teachers	Timing depends on how deep you choose to go into each activity, on students' engagement. These can be adapted to your teaching contexts. This Unit can be seen as an example of activities for SEE.	
Addressing GreenComp	Embodying sustainability values	
	X	1.1 Valuing sustainability To reflect on personal values; identify and explain how values vary among people and over time, while critically evaluating how they align with sustainability values.
		1.2 Supporting fairness To support equity and justice for current and future generations and learn from previous generations for sustainability.
	X	1.3 Promoting nature To acknowledge that humans are part of nature; and to respect the needs and rights of other species and of nature itself in order to restore and regenerate healthy and resilient ecosystems.
	Embracing complexity in sustainability	
		2.1 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.
	X	2.2 Critical thinking To assess information and arguments*, identify assumptions, challenge the status quo, and reflect on how personal, social and cultural backgrounds influence thinking and conclusions.
	X	2.3 Problem framing To formulate current or potential challenges as a sustainability problem in terms of difficulty, people involved, time and geographical scope, in order to identify suitable approaches to anticipating and preventing problems, and to mitigating and adapting to already existing problems.
	Envisioning sustainable futures	
		3.1 Futures literacy To envision alternative sustainable futures by imagining and developing alternative scenarios and identifying the steps needed to achieve a preferred sustainable future
	X	3.2 Adaptability To manage transitions and challenges in complex sustainability situations and make decisions related to the future in the face of uncertainty, ambiguity and risk.
	X	3.3 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	
		4.1 Political agency To navigate the political system, identify political responsibility and accountability for unsustainable behaviour, and demand effective policies for sustainability.
X	4.2 Collective action To act for change in collaboration with others.	
X	4.3 Individual initiative To identify own potential for sustainability and to actively contribute to improving prospects for the community and the planet.	

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