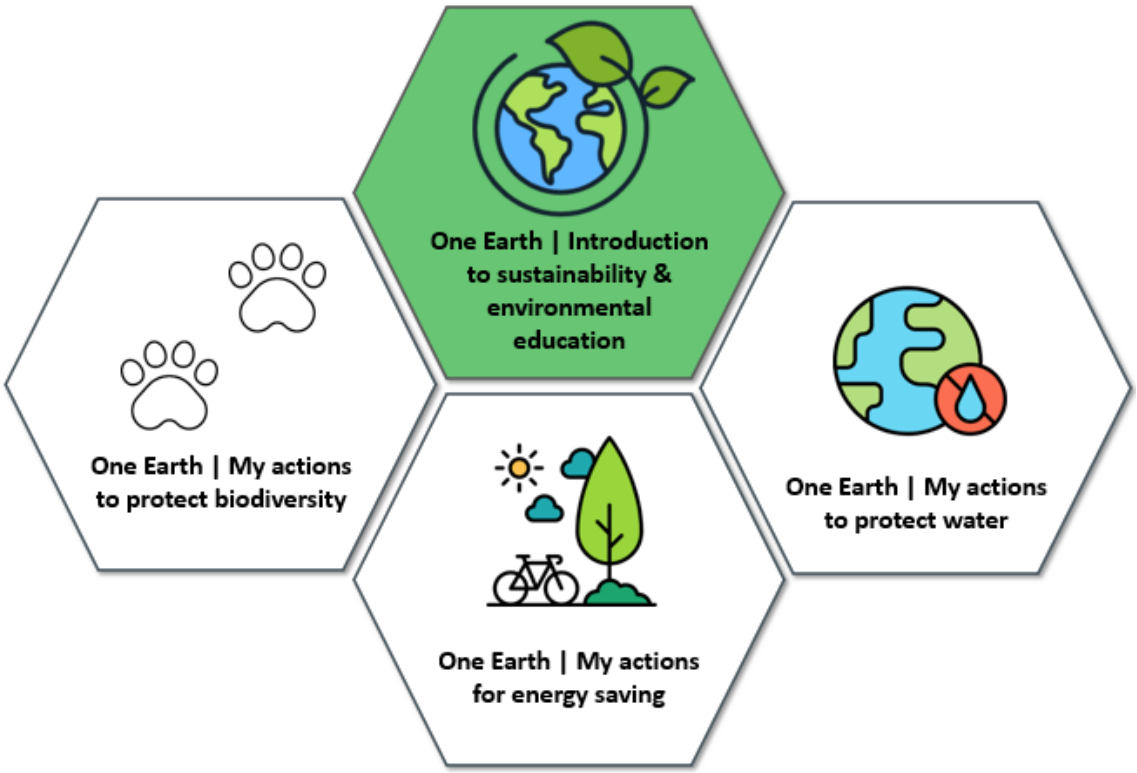
Teacher Academy Project
TEACHING SUSTAINABILITY



SUSTAINABILITY AND ENVIRONMENTAL EDUCATION

Learning and Teaching Package 3

Overview of LTP 3 Units

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Overview

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.

Piloting of the materials within TAP-TS

The materials of Unit 1 were piloted in classes of didactic in initial teacher education courses. The materials are also presented as a Moodle course on TAP-TS Platform - https://tap-ts.eu/course/view.php?id=13

ECTS Distribution

UNITS	HOURS	ECTS
UNIT 1. INTRODUCTION TO SUSTAINABILITY & ENVIRONMENTAL EDUCATION	5	0,25
UNIT 2. ONE EARTH: MY ACTIONS TO PROTECT BIODIVERSITY	5	0,25
UNIT 3. ONE EARTH: MY ACTIONS TO PROTECT WATER	10	0,5
UNIT 4. ONE EARTH: MY ACTIONS FOR ENERGY SAVING	10	0,5
		1,5

*Taught plus personal learning follow-out

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: • Environmental education • STEAM subjects • Citizenship education	**Start-up:** Activity 1. Connections of Sustainable Development Goals with environmental education **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 **Consolidation:** Activity 5. Reflection about biodiversity, water and energy **Follow up:** Activity 6. Reflection about teacher practice	Teachers' self-reflection
Intended Learning Outcomes	**Having worked through the activities and materials, teachers will be able to:** ✓ 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	• Worksheets • Construction blocks • Laptops and smartphones • Sigle-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: • Environmental education • Science • Mathematics • (Digital) media education • Citizenship education	**Start-up:** Activity 1. Biodiversity meaning **Development:** Activity 2. Creation of an ecosystem Activity 3. Biocube	Rubric to students evaluate their progress

				Consolidation: Activity 4. Creation of a digital resource about ecosystem protection **Follow up:** Activity 5. Reflection about primary school students' conceptions about ecosystems Activity 6. Reflection about teacher practice	

Intended Learning Outcomes	**Having worked through the activities and materials, students will be able to:** ✓ 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	• 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	• 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: • Environmental education • Science • Mathematics • (Digital) media education • Citizenship education	**Start-up:** Activity 1. The world's water Activity 2. Water distribution on Earth **Development:** Activity 3. Water around me Activity 4. My actions to save water **Consolidation:** Activity 5. Creation of a digital resource about water saving **Follow up:** Activity 6. Reflection about teacher practice	Rubric to students evaluate their progress
Intended Learning Outcomes	**Having worked through the activities and materials, students will be able to:** ✓ 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	• Paper • Worksheets • Robot and board • Model of a house • Laptops, tablets or smartphones • Scratch game				

Cooperation/ Networking	• 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: • 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.

				Activity 6. Is energy accessible to everyone? Activity 7. How does a Wind turbine work? Let´s build one! **Consolidation:** Activity 8. How can we act in the community to promote energy saving? Activity 9. How can I save energy? **Follow-up:** Activity 10. Reflection about teacher practice	

Intended Learning Outcomes	**Having worked through the activities and materials, students will be able to:** ✓ 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	optional/ideal: Unit 1. Introduction to Sustainability and Environmental Education You can also explore LTP 2 Sustainability and Digitality Unit 3
Required materials	• 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	• Local environmental NGO's • Renewable Energy Communities • Local renewable energy company • Children's family and Local Community
Practical Notes for Teachers	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. 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.
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.

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