

SUSTAINABILITY AND ENVIRONMENTAL EDUCATION

Learning and Teaching Package 3

UNIT 2. ONE EARTH: MY ACTIONS TO PROTECT BIODIVERSITY

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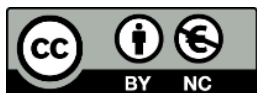
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Overview

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 2 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.

Teachers and student teachers must be able to discuss and reflect about practices that protect ecosystems and biodiversity. Therefore, promoting reflection about the primary school students' understanding about the concept of biodiversity, the causes of biodiversity loss and what actions they individually or collectively can do to protect it, is the aim of this unit.

The materials aim to give ideas to bring them into teacher education and schools and can be adapted for various contexts and enriched further. The 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 inquiry-based learning. All activities are guided by a question. Starting with one or more initial questions, the student is 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. This unit is focused on action-oriented learning. Through collective discussions, the participants are going to reflect about human impact on biodiversity and actions to mitigate that impact. Real-life examples are going to be used to raise questions.

Environmental Education: Background information

The aim of this Unit is to provide teachers, student teachers as well as students in schools situations to reflect about biodiversity, biodiversity loss, and actions to protect biodiversity. It aims to focus on the benefits of protecting biodiversity to the equilibrium of ecosystems and human well-being. Understanding, sharing and discussing the experiences and learning that has taken place, together with individual and collective reflection on all the activities carried out, will allow for the construction of in-depth, integrated and meaningful knowledge about biodiversity protection.

Piloting of the materials within TAP-TS

Some materials of Unit 2 were firstly presented during a Summer School, in Larnaca, Cyprus, as a workshop for practicing teachers, student teachers and teacher educators. The materials were further developed and experienced in initial teacher education courses, in Santarém. The materials are also presented as a Moodle course on TAP-TS Platform - <https://tap-ts.eu/course/view.php?id=13>. Some materials were also presented in an Active Learning Event, in Santarém.



UNIT Overview

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 • (Digital) media education • Citizenship education 	<p>Start-up: Activity 1. Biodiversity meaning</p> <p>Development: Activity 2. Creation of an ecosystem 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 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 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"> • Paper with 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		
	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.
		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 DESCRIPTION

Start-Up

The aim of the start-up activities is to impart students with a comprehensive understanding of biodiversity.

Estimated
Duration
30 min

Activity 1. Biodiversity meaning



Small group activity aimed to raise students' understanding about the biodiversity concept.

GreenComp Reference:
1.1 Valuing Sustainability;
1.3 Promoting Nature

Preparation for Activities: Classroom space should be organized for group work.



Description



What is biodiversity?

1.  Show the video [What is biodiversity?](#).
2.  Organize students in small groups and ask them to reflect about the **biodiversity** concept. Suggested questions to stimulate discussion:
 - Does Earth have a lot of biodiversity?
 - Why is biodiversity important to Earth?
 - Why is biodiversity relevant to the food we eat?
 - What problems are harming biodiversity?
 - How much is the reduction of insects in Europe?
 - What kind of organisms have you seen on the video?
 - Why are we facing a new mass extinction?

30 min






3.  After discussion in small groups, students should reflect and share ideas on a digital resource, such as Padlet® or Mentimeter® .

  Suggested questions to engage students' participation:



- What is the meaning of biodiversity for you?

Development

<p><i>The aim of the development activities is to impart students with a comprehensive understanding of the dynamics of ecosystems and how the human activities can harm ecosystems and actions to protect or restore the ecosystem.</i></p>		<p>Estimated Duration 120 min</p>
<p>Activity 2. Creation of an ecosystem</p> <p>Small group activity with construction blocks to develop their understanding about ecosystems, damages to ecosystems and actions to protect them.</p> <p>GreenComp Reference: 1.2 Valuing Sustainability; 1.3 Promoting Nature; 3.3 Exploratory Thinking.</p>	<p>Preparation for Activities: Students should be organized in small groups.</p> <p>A Note for a Teacher: In this section students will do, in group work, a hands-on activity using construction blocks about biodiversity, ecosystems and the human impact on biodiversity and ecosystems. Enough quantities of construction blocks should be arranged for each group.</p>	<p>60 min</p>
	<p>Description</p> <p> What are the features of an ecosystem? What can harm an ecosystem? Which actions you can do to protect or restore the ecosystem?</p> <ol style="list-style-type: none">  Show the video Ecosystem to the students.  Ask them questions to promote reflection about ecosystems. Suggested questions to stimulate discussion: <ul style="list-style-type: none"> • What happened to the pond? • What is an ecosystem? • What is the biotic component of an ecosystem? Please, present some examples. • What is the abiotic component of an ecosystem? Please, present some examples. • Which is the size of an ecosystem? 	




- A human body can be an ecosystem?
- What is an ecosystem niche?

3.  Then, organize the students in groups (3-4 students) and distribute them different construction blocks. **The students should create an ecosystem, in group work.** To create the ecosystem, students must:
- Define the type of the ecosystem they are going to create (terrestrial, aquatic, terrestrial and aquatic, etc.)
 - Identify the species to be represented and elucidate the relationships between them and their environment. (Example: Fishes and algae must be represented on an aquatic environment. The fishes could be predators of algae).
4.  After the creation of the ecosystem, students should use sheets of paper with different colours to answer the following questions (Figure 1):

<p>1. Describe the ecosystem.</p>	<p>2. Identify possible damages in the equilibrium of the ecosystems and its causes.</p>	<p>3. Identify actions to protect or restore the ecosystem.</p>
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Figure 1. Questions about the ecosystem created with construction blocks.



5.  Ask students to share their ecosystems, and their answers to the previous questions, in a digital resource, such as Padlet® or similar (Figure 2).

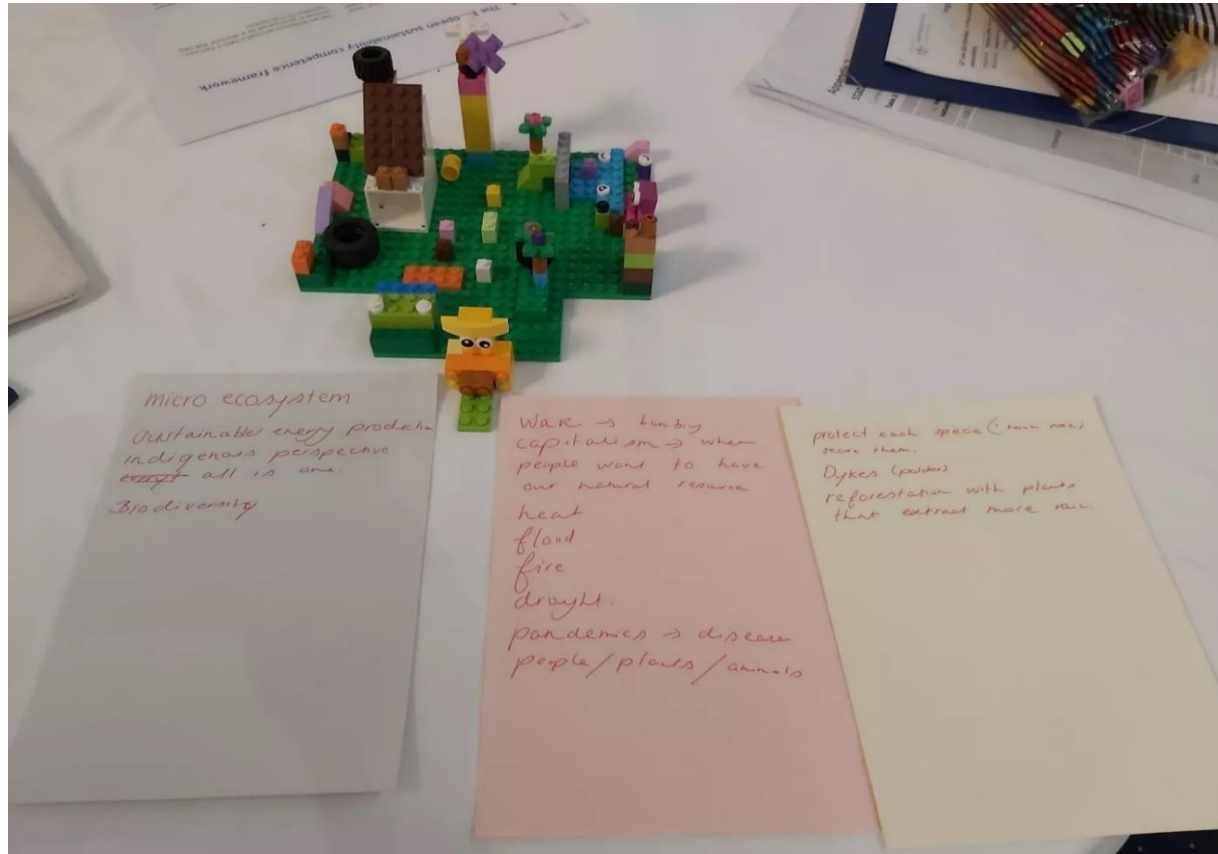


Figure 2. Example of an ecosystem and reflection done by a group of participants in the TAP-TS Summer School, in Larnaca, Cyprus, on July 2023.



Activity 3. Biocube

Small group activity related with a biocube to develop their understanding about biodiversity.

GreenComp Reference:


1.1 Valuing Sustainability;
1.3 Promoting Nature;
3.3 Exploratory Thinking.



Preparation for Activities: Students should be organized in small groups. Teacher needs to prepare the material to create a biocube and organize the outdoor activity of observation of biodiversity with the cube.

A Note for a Teacher: This activity explores the theme of biodiversity. Biodiversity is included in the Sustainable Development Goals (SDGs), particularly in SDG 15 “Protect life on Earth” of the agenda that aims to reach 2030.

60 min

Description

 **What biodiversity is observable within the biocube? What relationships among organisms and between organisms and their environment can be observed?**

-  Watch the video [A world in one cubic foot](#) and ask students if they understood what is a biocube and how is used.
-  Then, each group of students must create their own biocube, creating a 3D cube. The measures of the biocube are a cubic foot (approximately with 30 cm edge length), as exemplified in the video or in the example presented on figure 3.

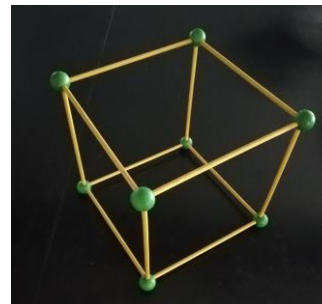


Figure 3. Example of a cube (biocube).



3.  Next, students should select a natural environment within the school or nearby the school.




4.  Each group should install their biocube in a natural spot. Then, they must observe carefully the biodiversity within the biocube and take pictures to different species with smartphones (Figure 4) .



Figure 4. Example of a biocube content, during winter, in Santarém, Portugal.

5.  Furthermore, each group should analyze and identify examples of the relationships among organisms and between organisms and their environment (For example, in figure 4 mushrooms contribute to the decomposition of organic matter, contributing for the soil formation).

6.  Ask students to take notes about their observations. The following questions can guide their observations and notes:

- What are the weather conditions?
- What are the main characteristics of the ecosystem?
- Which organisms are within in the biocube? Please, list the organisms.
- What non-living materials are within the biocube? Please, list the materials.





- | | | |
|--|---|--|
| | <ul style="list-style-type: none">• What relationships are observable among the organisms?• What relationships are observable among the organisms and the environment?• Are some human interferences observable within the biocube? | |
|--|---|--|



Consolidation

<p><i>The aim of the consolidation activities is to create a digital resource about ecosystem protection</i></p>		<p>Estimated Duration 90 min</p>
<p>Activity 4. Creation of a digital resource about ecosystem protection</p> <p>Small group activity aimed to raise the community awareness of ecosystem protection.</p> <p><i>1.1Valuing Sustainability;</i> <i>1.3Promoting Nature;</i> <i>3.3Exploratory Thinking;</i> <i>4.2 Collective action</i> <i>4.3 Individual initiative</i></p>	<p>Preparation for Activities: Classroom space should be organized for group work. The groups need to use laptops.</p> <hr/> <p>Description</p> <p> What can you do to raise the community awareness about ecosystem protection?</p> <ol style="list-style-type: none"> 1.  Ask students to select a digital resource to create a poster about ecosystem protection (e.g. Canva®; PowerPoint®; Genially®) 2.  Students, in group work, should organize the data collected about the content of the biocube (work done in activity 3), and elaborate the digital poster. The poster should integrate the following aspects: <ul style="list-style-type: none"> • School; • Authors; • Suggestive title; • Brief characterization of the environment and weather conditions; • Date of observation of the biocube; • Images of the full ecosystem in the biocube and specific elements of the ecosystem (organisms and some non-living materials); • Relations between the elements of the ecosystem observed; • Eventual identification of the ecosystem damage observed; • Actions to protect or restore the ecosystems; • Main conclusions about ecosystem protection; • References. 	<p>90 min</p>



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|--|--|--|
| | <ol style="list-style-type: none">3.  The groups should share the organisms and non-living materials identified in the biocube, presenting their posters to the whole class.4.  Students also can share and discuss their work with the community (e.g in-person presentations to the community; using social media to share their work, etc.). | |
|--|--|--|

Follow-Up

The aim of the follow-up activities is to reflect about the teacher practices.

**Estimated
 Duration
 60 min**

Activity 5. Reflection about primary school students' conceptions about ecosystems

Collective discussion aimed to reflect about primary students' conceptions about ecosystems.

Description


What are the primary school students' conceptions about ecosystems damage and protection?


 Analyse the **Poster _ Primary students' conceptions about ecosystems damage and protection.**


 Discuss with other teachers the following questions:

- Why is important to primary school students understand the meaning of biodiversity and ecosystems?
- How can I mobilize the work done in this workshop to my teaching context?
- Which GreenComp competences I think I can develop in my primary school students using this work?


30 min

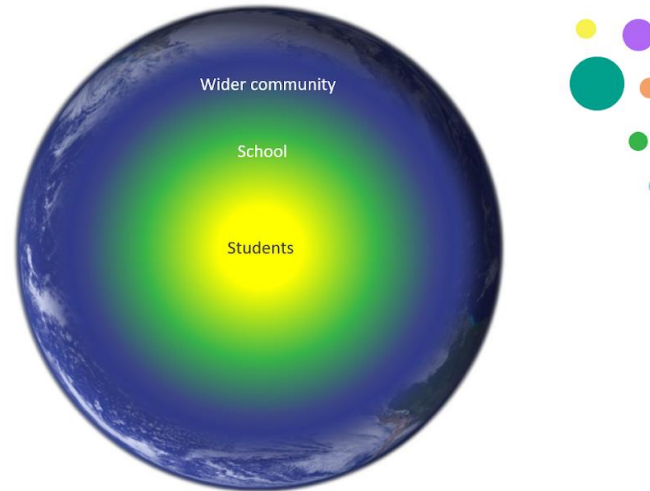


Activity 6. Reflection about teacher practice Reflection on teacher practice

This is an activity aimed at helping reflection (individually and/or with colleagues) on how the previous activities contribute to developing sustainability competences and acting in a more sustainable way.

How can I mobilize the activities in my teacher practice?

 Please reflect on two or three of the following dimensions at three levels of engagement (students - teacher; school; and wider community and beyond):




Dimension 1. Learning objectives:

- In what ways do these activities contribute to the global educational goals for your students? You might consider in particular LTP methods, materials, tools and activities you would or have implemented/transferred from the TAP-TS LTP into your regular teaching curricula.
- 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?


30 min





 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?



Dimension 2. Integration with different subjects:


 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?


 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? In your opinion, do the LTP materials, tools and methods you have implemented also offer potential for use in other subjects? If so, in which subjects?

 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?



Dimension 3. Inclusion:

 Can the previous activities contribute to all students' participation and learning? What actions can you take to ensure the learning of all students?

 How have the activities contributed to engage with different perspectives to consider sustainability challenges and opportunities?



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?



Dimension 4. Environmental / Sustainability awareness:

To what extent do the activities promote awareness and responsibility among your students?

Did the implemented LTP materials, methods or tools increased or rather limited the opportunity to increase students' environmental awareness?

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?

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



Digital resources and equipment:

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?

How did you try to enable students to use resources for learning at school in a sustainable way?

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?



Community involvement:

- To what extent can you involve the local community or connect with community issues related to the sustainability theme approached?
- Have the selected and implemented LTP 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?
- 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?



Assessment and feedback:

- Have you adapted the original assessment methods or the requirements for students after integrating the LTP materials, methods, or tools into your existing teaching concept? If yes, in which way/how?
- 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.
- 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.

Glossary

Abiotic component: Non-living elements of an ecosystem.

Biocube: A biocube is a cubic-shaped construction that is placed in a natural environment, and which allows observation to be focused on the biodiversity of a specific ecosystem.

Biodiversity: Consists of the variety of life on Earth. It manifests at different levels, from the genetic diversity within each population to the variety existing across different species, ecosystems, and ecological processes on a global scale. In general, there are three main levels of biodiversity:

Genetic Diversity: Refers to the variety of genes within a population. The greater the genetic diversity, the higher the population's ability to adapt to changes in the environment.

Species Diversity: Pertains to the variety of different species in an ecosystem (which can vary in size) or across the entire planet. Each species plays a unique role in the ecosystem and contributes to its balance.

Ecosystem Diversity: Encompasses the variety of ecosystems supporting different forms of life. Ecosystems, in turn, feature a wide range of habitats used by these life forms. Additionally, ecosystems provide a variety of services (such as water quality improvement, nutrient recycling) utilized by living organisms. Ecosystems undergo changes caused by global processes (such as plate tectonics, the water cycle, among others), influencing the living beings inhabiting them.

Biotic component: Living elements of an ecosystem.

Ecosystem: A biological system composed of all the organisms found in a particular physical environment, interacting with it and each other ([Oxford English Dictionary](#)).

Environmental damage: Environmental damage or degradation is the deterioration of the environment through depletion of resources such as air, water and soil; the destruction of ecosystems and the extinction of wildlife. It is defined as any change or disturbance to the environment perceived to be deleterious or undesirable ([United Nations Environment Program](#)).

Environmental protection: Any activity to maintain or restore the quality of environmental media by preventing the emission of pollutants or reducing the presence of polluting substances. It may consist of (1) changes in characteristics of goods and services, (2) changes in consumption patterns, (3) changes in production techniques, (4) treatment or disposal of residuals in separate environmental protection facilities, (5) recycling, and (6) prevention of degradation of the landscape and ecosystem ([National Academies of Sciences, Engineering, and Medicine](#)).

Environmental restoration: Reactive environmental protection. It includes: (1) reduction or neutralization of residuals; (2) changes in the spatial distribution of residuals; (3) support for environmental assimilation; and (4) restoration of ecosystems, landscape, and so forth ([National Academies of Sciences, Engineering, and Medicine](#)).



Glossary of Icons



- Video



- Quiz



- Worksheets



- Editable Worksheets



- Various Media, e.g. Learning Apps



- Text to Read; or engaging in active listening or learning from presentations



- A question to Respond or a Question for Reflection



- A Discussion



- A task for an inquiry or search



- Focusing Activity



- A Reflection Activity



- An Activity for Action



- a short note for a teacher



Worksheets and links

Start-Up

Activity 1. Biodiversity meaning

- Video  [What is biodiversity?](#)

Development

Activity 2. Creation of an ecosystem

- Video  [Ecosystem](#)

Activity 3. Biocube

- Video  [A world in one cubic foot](#)

Follow-up

Activity 5. Reflection about primary school students' conceptions about ecosystems

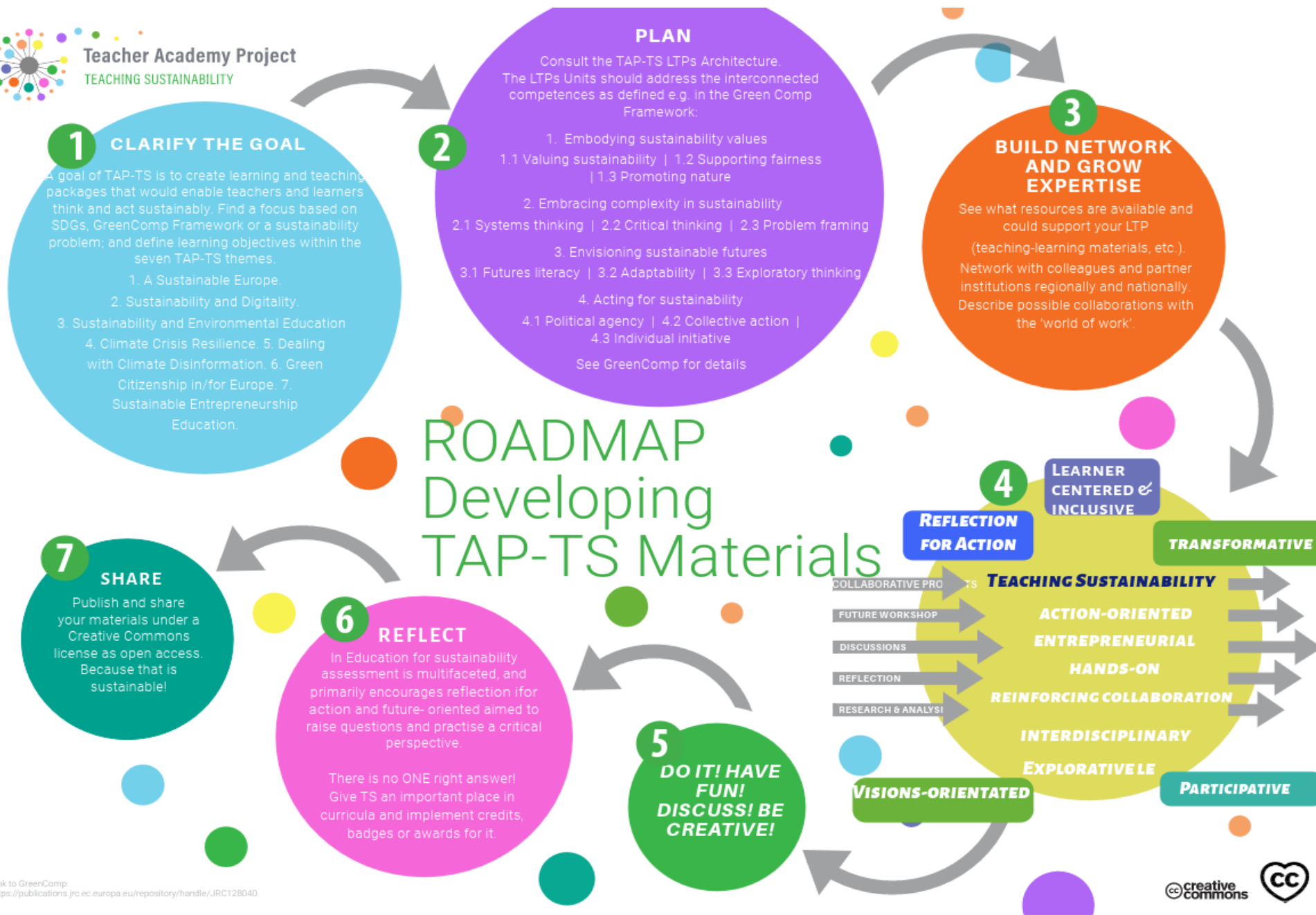
- Poster  Primary students' conceptions about ecosystems damage and protection

TAP-TS 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 on the next page.

TAP-TS Roadmap: the Steps / stages in the TAP-TS LTPs Design Journey

1: Clarify the Goal	<p>Our overarching goal is to enable 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> <ul style="list-style-type: none"> 2.1 A Sustainable Europe. 2.2 Sustainability and Digitality. 2.3. Sustainability and Environmental Education. 2.4 Climate Crisis Resilience. 2.5 Dealing with Climate Disinformation. 2.6 Green Citizenship in/for Europe. 2.7 Sustainable Entrepreneurship Education.
2: Competency Areas	<p>The LTPS should be aligned with the interconnected four competences defined in the Green Comp Framework: • Embodying sustainability values • Embracing complexity in sustainability • Envisioning sustainable futures • Acting for sustainability</p>
3: Networking & Bundle Expertise	<p>There are many exciting topics. 1. Find a focus: what driving question is at the centre of your LTP. 2. See what resources are available (competencies, teaching-learning materials, etc.). 3. Network with colleagues and partner institutions regionally and nationally.</p>
4: Working through the design process	<p>Teaching Sustainability should be: action-oriented learning; hands-on; focussing on real life challenges; stimulate creative collaboration between teachers and learners; visions-oriented; participatory and action oriented . 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.</p>
5: ASSESSMENT DESIGN And REFLECTION	<p>In Education for Sustainability assessment can be multifaceted and primarily encourage reflection and be evidence based. 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.</p>
6: PUBLISH TO TAP-TS PLATFORM	<p>Can you and where can you publish your materials under a Creative Commons license as free as possible. Because that is sustainable!</p>





Teaching Sustainability: Learning activity Template

1. Introduce yourself!

My name:
My country:
My role:
My school:
My class:

2. OVERVIEW

Provide a brief description of the learning activity, including information about the targeted age group and duration. Clearly state the motivation behind your learning activity and explain which elements of the curriculum your learning activity is related to.

Age Group:

Duration:

Related Themes of Sustainability:

Description:

3. LEARNING OUTCOMES

What are the learning outcomes of this learning activity, and which key GreenComp competences does it promote?

4. LEARNING APPROACH

Having in mind the learning outcomes, what active learning approaches will be applied?

Specify the engagement strategies and sequence of learning tasks that students will develop in the context of the activity. Explain how GreenComp competences will be promoted.

What will be the role of the teacher, and what will be the students' role? How will the students work—individually or in groups?

5. DIGITAL RESOURCES

Which digital technologies, including tools, services, and resources, will be utilized in the activity? Additionally, how will these digital technologies be effectively integrated to enhance lesson outcomes and student understanding?

6. ASSESSMENT

What assessment strategies and instruments will be employed to evaluate student learning?

GreenComp Framework: the European Sustainability Competence Framework

Within the TAP-TS Project, *GreenComp* (Bianchi et al., 2022) serves the following purposes: design of learning and teaching packages; development of TAP-TS professional development activities, (self)-reflection, and evaluation. The aim of GreenComp is to foster a sustainability mindset by helping teachers and students develop the knowledge, skills and attitudes to think, plan and act with empathy, responsibility, and care for our planet.

Visual representation of *GreenComp*:



GreenComp consists of 12 competences (in bold) organised into the four areas (in italics) below:

- *Embodying sustainability values, including the competences*
 - **valuing sustainability**
 - **supporting fairness**
 - **promoting nature**
- *Embracing complexity in sustainability, including the competences*
 - **systems thinking**
 - **critical thinking**
 - **problem framing**
- *Envisioning sustainable futures, including the competences*
 - **futures literacy**
 - **adaptability**
 - **exploratory thinking**
- *Acting for sustainability, including the competences*
 - **political agency**
 - **collective action**
 - **individual initiative**

Reference: 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; ISBN 978-92-76-46485-3, doi:10.2760/13286, JRC128040.

Project partners



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