



Neutral Schools

METHODOLOGICAL GUIDE



Innovation and school action for a
Carbon neutral future

GUIDE TO THE ACTION FOR A CARBON NEUTRAL FUTURE



NEUTRAL SCHOOLS
Innovation and school action for a Carbon neutral future
ERASMUS+ Project: 2022-1-ES01-KA220-SCH-000088781



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GUIDE TO THE ACTION FOR A
CARBON NEUTRAL FUTURE

1. INNOVATIVE ADAPTATION OF THE SERVICE-LEARNING METHOD TO THE CLIMATE CHALLENGE SCOPE. GUIDEDANCE AND FOUNDATIONS

1.1 INTRODUCTORY ORIENTATIONS

1.1.1 General characteristics of the “Guide to the Action for a Carbon Neutral Future”

the NEUTRAL SCHOOLS project aims to provide resources and support materials to teachers for the integration of the Service-Learning methodology (SLM) in the educational Curriculum. Therefore, the aim of this result is to provide **guidance (principles, criteria, procedures and examples of learning situations) for the application of the Service-learning methodology to the educational scenarios related to the climate challenge.**

The guide will provide a demanded support for teachers to be able to implement these methodologies. SL method combines learning processes and actions at the service of the community, working on real needs of the environment with the aim of improving it.

The climate challenge has a strong STEM component, but also socio-economic, cultural, ethical and geographic issues. The transversal nature of the SLM methodology provides an ideal response to this problem and provides the capacity to undertake actions that go beyond the classroom.

NEUTRAL SCHOOLS facilitates the updating of teacher training so that their programs enable teaching-learning through a socially and environmentally useful experience. The collaborative nature of SL methodology will also be useful to support them in motivating against drop-out and exclusion of pupils with learning difficulties or discrimination problems.

According to the 17 Sustainable Development Goals (SDGs), an educational environment that enables critical thinking and student engagement is vital to the success of Education for Sustainable Development (ESD). The application of the SLM methodology is useful for successful ESD implementation. Thus, both students, working as a team applying their acquired skills and knowledge, and society, which is served through this methodology, benefit.

The SLM methodology is very useful for transmitting values linked to environmental, social and economic sustainability and for the application of the SDGs and the European Green Deal in the educational field.

The collaborative nature of SLM will also be useful to support and motivate the education system in the face of dropout and exclusion of students with learning difficulties or discrimination problems.

This project outcome will guide teachers in relation to programming, implementation and evaluation based on SL, providing didactic units of learning situations that they can integrate into the development of their teaching plan autonomously.

■ 1.1.2 Target Educational Levels

The educational levels targeted by the NEUTRAL SCHOOLS Curriculum: **BASIC EDUCATION (MANDATORY)**: PRIMARY EDUCATION and LOWER SECONDARY EDUCATION (levels between 6 and 16 years). Although there are differences in the organizational structure of the educational levels in the different European countries, we can say that according to the **International Standard Classification of Education (ISCED)**, the levels to which the NEUTRAL SCHOOLS project school curriculum is adapted are **levels 1 and 2**, i.e. **Primary education or first stage of basic education** and **Lower Secondary education or second stage of basic education**.

■ 1.1.3. General Structure Of The Guide

According to the proposal of the project approved the preliminary outline of the main parts in the structure of the guide is as follows:

1. Innovative adaptation of the service-learning method to the climate challenge. Guidance and foundations

1.1. Introductory orientations

- 1.1.1. General characteristics of the “Guide to the action for a carbon neutral future”
- 1.1.2. Target educational levels
- 1.1.3. General structure of the guide

1.2. Foundation of the service-learning methodology and its application to the climate challenge

- 1.2.1. Introduction
- 1.2.2. Review of the historical evolution of the Service-Learning methodology
- 1.2.3. Innovations of the Service-Learning Methodology
- 1.2.4. Application of the methodology to education for sustainable development and the fight against climate change

1.3. Guidance for the application of the methodology and its integration in the school curriculum

2. Learning Situations With Service-Learning Methodology

Design and guidelines for the implementation of “Learning situations with SL methodology” on the topic of the climate challenge, structured around the lines of action of the EUROPEAN GREEN DEAL. To achieve the goal of carbon neutrality, the European Green Deal includes a series of parallel and complementary lines of action: clean energy, circular economy, building efficiency, agriculture, sustainable mobility, biodiversity protection and pollution control; with the approach that all of them must be approached from the perspective of social justice.

Therefore the examples of learning situations have been organized around the following topics:

1. Clean energy
2. Sustainable Industrialization - Circular Economy
3. Efficient and sustainable building
4. Sustainable agriculture and food
5. Sustainable mobility
6. Pollution control
7. Protecting biodiversity and forests

1.2 FOUNDATION OF THE SERVICE-LEARNING METHODOLOGY AND ITS APPLICATION TO THE CLIMATE CHALLENGE SCOPE

1.2.1 INTRODUCTION

The contemporary global scenario is marked by pressing environmental challenges, prominently the climate crisis. As educators, it is imperative to equip our students not only with knowledge but also with the skills and values necessary to address these challenges. In this guide we delve into the innovative adaptation of the service-learning method to effectively tackle the climate challenge within the educational context.

The integration of service-learning into the School Educational Curriculum provides a structured framework for incorporating climate education and sustainability principles across various subjects and grade levels. Collaborative planning between educators, community partners, and students ensures alignment with academic goals and learning objectives while addressing real-world issues. Service-learning projects can be integrated into science, social studies, language arts, and other subjects, offering interdisciplinary learning opportunities. Additionally, the incorporation of service-learning into the curriculum fosters a sense of civic responsibility and active citizenship, preparing students to become informed and engaged global citizens capable of addressing the challenges of the 21st century.

The adoption of service-learning as a tool for addressing the climate challenge presents numerous perspectives for action in the Face of the Climate Challenge. By

actively engaging in real-world projects, students develop a deep understanding of environmental issues and a sense of agency to effect positive change. Moreover, service-learning promotes interdisciplinary collaboration, critical thinking, and problem-solving skills essential for addressing complex environmental problems. It cultivates empathy and a sense of responsibility towards the environment, empowering students to become active agents of change in their communities and beyond. Through service-learning, students not only learn about climate change but also actively contribute to mitigation and adaptation efforts, fostering a culture of sustainability and environmental stewardship.

In conclusion, the innovative adaptation of the service-learning method to the climate challenge represents a proactive approach to environmental education that empowers students to become agents of change in their communities. By integrating service-learning into the school curriculum, educators can cultivate a generation of environmentally conscious individuals equipped with the knowledge, skills, and values necessary to address the pressing climate crisis. Together, we can harness the transformative potential of service-learning to create a more sustainable and resilient future for all.

■ 1.2.2 REVIEW OF THE HISTORICAL EVOLUTION OF THE SERVICE-LEARNING METHODOLOGY

The Service-Learning method has experienced remarkable growth and development from its emergence in the 1960s to the present day, becoming a widely recognized and valued educational practice around the world.

Its ability to integrate academic learning with community service offers a powerful approach to foster students' meaningful learning, personal development and civic engagement in diverse educational and social contexts.

• **Origins and early development (1960s - 1980s):**

The Service-Learning method has its roots in the progressive education and community service movements that emerged in the United States during the 1960s. During this period, a number of educators and activists began to explore ways to integrate academic learning with community service.

The underlying philosophy of Service-Learning was based on the idea that community service not only benefited others, but also enriched students' education and personal development.

• **Consolidation and recognition (1990s - early 2000s):**

During the 1990s, the concept of Service-Learning began to gain recognition and popularity in educational and academic circles. Organizations and institutions were established to promote and support the development of Service-Learning in schools, universities and communities.

The focus broadened to include a variety of disciplines and subject areas, and the importance of critical reflection on the service experience was emphasized.

• **Global expansion and diversification (Early 2000s - Nowadays):**

As Service-Learning continued to gain importance, it expanded beyond the United States and was adopted in different parts of the world.

Multiple approaches and models of Service-Learning were developed to suit diverse cultures, contexts and educational needs. Service-Learning has been used at a variety of educational levels, from primary to higher education, as well as in non-formal education and community development programmes.

Partnerships have been established between educational institutions, non-profit organizations, government agencies and businesses to facilitate the successful implementation of service-learning.

Academic research has supported the effectiveness of service-learning in improving academic achievement, developing social-emotional skills and promoting student civic engagement.

Today, Service-Learning continues to evolve and adapt to the challenges and opportunities of the 21st century, including growing concerns about climate change, social justice and equity.

Service-Learning is becoming an integral part of education policies and curricula in many countries, recognizing its value as an effective tool for promoting meaningful learning and civic engagement among students. New ways of integrating technology and e-learning into service-learning are being explored, expanding its reach and accessibility.

■ **1.2.3 INNOVATION OF THE SERVICE-LEARNING METHODOLOGY**

Service-Learning (SL) is an educational methodology that, as its name suggests, allows for the integration of community services and learning. Projects based on this method are designed to combine academic learning with meaningful service to the community, integrating academic learning with the active participation of students in community service. The main objective of this pedagogical approach is to foster students' personal and social development by combining academic learning with the contribution to the improvement of society.

Students apply the knowledge acquired in the classroom to address real needs that have previously been diagnosed as important in the students' more or less immediate environment.

Service-Learning projects can address a variety of topics, from social and environmental issues to specific local needs. This methodology has been successfully implemented at various educational stages, from primary to higher education, and has proven to be effective for meaningful learning and the development of social skills.

The Service-Learning methodology offers a number of advantages and benefits for both students and the wider community.

Some of the key innovations of this Service-Learning methodology are:

- a) Active participation and practical understanding:** students not only absorb information passively, but also actively participate in projects that have a real impact on the community. This involves the practical application of competences, skills and knowledge in real-world situations.
- b) Mutual benefits:** The community benefits from the service provided by the students, and the students in turn acquire practical skills, develop a sense of social and environmental responsibility, and better understand the relevance of what they learn in class and the practical applications of knowledge.
- c) Reflection:** The methodology includes a reflective component that encourages students to analyze and understand the broader implications of their actions. Reflection helps to internalize lessons learned and to develop students' reflective skills and thus critical thinking.
- d) Collaboration:** Encourages collaboration among students, educators, and community members. Collaboration is essential to effectively address challenges and generate sustainable solutions.
- e) Development of active citizenship and other civic competencies:** Service-Learning seeks to cultivate active and engaged citizens who understand their ability to contribute positively to society.
- f) Social Responsibility:** Service-Learning projects foster a sense of social responsibility by making students aware of the needs and challenges of their community and providing them with the opportunity to actively address them.
- g) Meaningful Learning:** Students participate in practical and meaningful projects that allow them to apply theoretical knowledge acquired in the classroom in a practical way, which facilitates deeper and more meaningful learning.
- h) Development of a wide range of skills:** Through Service-Learning projects, students develop a variety of skills, ranging from academic and technical skills to interpersonal, communication and teamwork skills.
- i) Sense of purpose:** Participation in community service gives students a sense of purpose by contributing positively to the well-being of others. This can increase motivation and self-esteem.
- j) Community collaboration:** The community benefits directly from the service provided by students, which strengthens the links between the educational institution and the local community.
- k) Relationship building:** Students have the opportunity to build meaningful relationships with members of the community, which can lead to long-term partnerships and a sense of belonging.
- l) Incentive for School participation:** Service-Learning can increase school participation and attendance, as students find meaning and relevance in what they are learning.

These advantages of the method highlight the ability of Service-Learning to enrich the educational experience, cultivate valuable skills and strengthen the ties between education and the community.

■ 1.2.4 APPLYING THE METHODOLOGY TO EDUCATION FOR SUSTAINABLE DEVELOPMENT AND COMBATING CLIMATE CHANGE

The Service-Learning (SL) methodology is presented as a powerful tool to address Education for Sustainable Development and the fight against climate change.

Service-Learning, traditionally known for its emphasis on experiential learning through community service, undergoes a transformative adaptation in response to the climate crisis. This innovation involves the integration of environmental education, sustainability principles, and civic engagement within the service-learning framework. Students are engaged in hands-on activities that not only contribute to their communities but also directly address climate-related issues. Whether it is tree planting initiatives, waste reduction projects, or advocating for renewable energy solutions, students actively participate in meaningful endeavors that foster environmental stewardship and resilience.

SL method can be integrated into the educational curriculum, which means that sustainable development and climate change issues are not simply an additional subject, but are intertwined with various academic disciplines.

It provides students with the opportunity to take concrete action to address environmental problems, to get directly involved in projects that contribute to sustainability and climate change mitigation. It offers a practical and experiential learning experience. Students not only acquire theoretical knowledge, but also experience the practical application of sustainable development principles.



Image source: <https://www.magisnet.com/2021/01/aprendizaje-servicio-la-educacion-unida-al-compromiso-social/>. 'Visibles' Project. CEIP "Pintor Pedro Flores" © REDAPS

The application of this methodology to the environmental and climate context has many educational potentials and advantages, such as the following:

1. Connection with environmental reality: It allows students to connect directly with the challenges of sustainable development and climate change in their communities. By addressing real problems, it fosters understanding and awareness of environmental issues.

2. Direct action: Provides students with the opportunity to take tangible action and actively contribute to environmental sustainability. This goes beyond theoretical learning, involving them in practical actions that positively impact the environment.

3. Practical skills development: Service-Learning projects focusing on sustainable development and climate change mitigation can develop practical skills for environmental and climate action, such as environmental management, sustainable planning and implementation of green solutions. It prepares students to face real challenges.

4. Active participation: Engages students actively in identifying and solving environmental problems. They contribute directly to initiatives that positively impact sustainability and climate resilience.

5. Awareness and commitment to action: Promotes environmental awareness and commitment through hands-on experience. Students not only learn about the importance of sustainability, but also directly experience how their actions can make a difference.

6. Community collaboration: Promotes collaboration with the local community. SL projects can involve students, educators, parents, community leaders and other community members, creating a network of support for sustainable initiatives.

7. Critical reflection: The SL methodology incorporates regular reflection sessions. This allows students to critically reflect on the implications of their actions, as well as to better understand the interconnections between individual decisions and collective outcomes in terms of sustainability.

8. Development of responsible citizenship: Contributes to the development of responsible citizens committed to sustainability. Students not only acquire knowledge, but also develop values and attitudes that support sustainable practices.

9. Integration of STEAM approach and innovation: Enables the implementation of innovative projects focused on sustainable solutions and adapted to the specific needs of the community. Students can propose and implement creative ideas to address environmental problems.

10. Leadership promotion: Facilitates leadership development among students as they take active roles in identifying, planning and implementing sustainable projects. Promotes a culture of environmental leadership.

11. Community engagement: Encourages students' engagement with their local community by addressing specific environmental issues that affect people in their immediate environment.

12. Development of critical awareness: Enables students to develop critical awareness of environmental issues and to understand the interconnections between individual decisions and collective outcomes.

13. Interdisciplinary Collaboration: Promotes interdisciplinary collaboration, as SL projects can be integrated into various curriculum areas, addressing environmental issues from a multifaceted perspective.

14. Development of Sustainable Citizens: Contributes to the development of committed and responsible citizens for sustainability. Students not only learn about climate change, but also develop attitudes and values that support sustainable practices.

15. Students' Empowerment: Empowers students by providing them with the opportunity to be agents of change in their community and contribute positively to efforts to address climate change and promote sustainability.

In summary, the Service-Learning methodology emerges as a valuable tool for integrating education for Sustainable Development and climate change action into the educational experience, enabling students to become active agents of change towards a more sustainable future. Service-Learning offers an effective platform to prepare students to address environmental challenges in an active and responsible way.



1.3 GUIDANCE FOR THE APPLICATION OF THE METHODOLOGY AND ITS INTEGRATION INTO THE SCHOOL CURRICULUM

The application of the Service-Learning methodology involves the integration of teaching and community service. The key to successful implementation of the Service-Learning methodology is active collaboration between the school and the community, constant reflection and long-term commitment.

Below we list some general considerations and summarize the main steps in implementing the Service-Learning methodology and integrating it into the Curriculum:

- 1. Identification of community needs:** The education community should collaborate with the community to identify their needs and challenges. This can be through surveys, meetings with community leaders or simply observing and listening to local concerns.
- 2. Defining learning objectives:** Clear educational objectives should be set that are aligned with curriculum standards. Objectives should be specific and measurable.
- 3. Designing meaningful projects:** Develop projects that address identified community needs while enabling students to acquire specific skills and knowledge.
- 4. Incorporation into the Curriculum:** Service-Learning projects should be integrated into the academic curriculum, ensuring that practical projects are related to the topics being taught in the classroom.
- 5. Preparation of students:** Students should be provided with information about the project, its purpose and associated learning objectives. It may also be necessary to provide specific training prior to or in parallel with the project if this is necessary for the development of a specific action.
- 6. Action in the community:** Some service action in the community should be planned. This may involve a wide range of activities for the community and in collaboration with the target population or social agents that may mediate or activate the programme.
- 7. Continuous reflection:** It is interesting to integrate regular reflection activities or sessions. Students should have the opportunity to discuss and reflect on their experiences, the challenges faced and what they have learned.
- 8. Evaluation of outcomes:** Evaluation of service and learning outcomes is essential. This may include assessing the impact on the community and evaluating how students have achieved the learning objectives.
- 9. Celebration of achievements:** Celebrate learners' achievements and highlight the positive contribution they have made to the community.
- 10. Sustainability of the programme:** If possible, ways should be sought to maintain and expand the project over time. This may involve establishing long-term partnerships with the community.

- 11. Integration into the school culture:** It is recommended to foster a school culture that promotes ongoing participation in SL activities. Projects can be incorporated into the curriculum on a regular basis.
- 12. Community participation:** The community should be involved in all stages of the process from the definition of needs and objectives to the dissemination and sustainability of the process. This strengthens relationships and will ensure that projects are truly beneficial.

We now outline more specifically how this methodology can be applied to Education for Sustainable Development and Climate Change:

- 1. Identification of local problems:** Start by identifying specific problems related to sustainability and climate change in the local community. This can include very diverse issues as will be seen in the development of the examples of learning scenarios in the second part of this Guide, related to sustainable mobility, energy saving and efficiency, waste management, conservation of natural resources, among many others.
- 2. Collaboration with the community:** It is important to try to work closely with the local community from the beginning of the programme, in order to try to understand their needs and the most important environmental challenges in the specific environment. This can involve local experts, non-governmental organisations and community leaders.
- 3. Developing meaningful projects:** Also involve students in the identification, planning and implementation of projects that address specific sustainability issues, ensuring that the projects and their objectives are meaningful and have a positive impact on the community and the environment.
- 4. Curriculum Integration:** Integrate projects into the school curriculum, linking them to issues related to sustainability, climate change and specific academic areas. This allows for a deeper connection between classroom learning and practical activities.
- 5. Development of skills, knowledge, awareness and engagement:** The development of knowledge related to sustainability and climate change but also of practical and research skills around the key project areas should be pursued.

In addition, awareness of environmental issues and the importance of sustainability should be promoted. Motivating students to actively participate in the search for solutions and to commit themselves to act and adopt sustainable living practices is one of the fundamental aims that can be achieved through this methodology.

The ultimate goal is to foster the development of citizens committed to sustainability, who understand the interconnection between individual actions and global well-being, instilling values of environmental and social responsibility.

- 6. Tangible Actions and Community Service:** Implement tangible actions that benefit the community and the environment. This could include awareness campaigns, energy efficiency projects, recycling programmes, interventions to improve specific environments, actions to promote sustainable mobility or energy saving, among many others.
- 7. Ongoing Evaluation:** Establish ongoing evaluation mechanisms to measure the impact of projects on the community and student learning. It is important to evaluate both the concrete tangible results of the interventions and the transformations in students' and community's understanding and attitudes towards sustainability.
- 8. Reflection and critical analysis:** It is important to incorporate thought-provoking educational activities where students critically analyze challenges encountered, progress made and lessons learned. This fosters students' critical analysis skills and critical awareness, as well as continuous programme improvement.
- 9. Celebration of Achievement:** Recognizing and rewarding students' efforts in promoting sustainability and combating climate change and continuously celebrating achievements, both at community and academic levels, is an aspect that should not be overlooked during the programme.
- 10. Dissemination and awareness-raising:** Promoting the dissemination of projects and results locally and, if possible, more widely can inspire other communities and schools to adopt similar practices and contributes to the sustainability of the programme.

By applying the Service-Learning methodology in Education for Sustainable Development and combating Climate Change, a meaningful connection is created between academic learning, practical action and community service, enabling students to become active agents of change towards a more sustainable future.





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2. LEARNING SITUATIONS WITH SERVICE-LEARNING METHODOLOGY FOR THE CLIMATE CHALLENGE

2.1 PLANNING LEARNING SITUATIONS BASED ON THE SERVICE-LEARNING METHOD FOR A CARBON NEUTRAL FUTURE

The main aim of this methodological guide is establishing the guidelines for the implementation of learning situations with the Service-Learning methodology, as a support for teachers.

In addition to the general guidelines for the adaptation of the service-learning method to the climate challenge scope in education, included in the first part of this guide, we provide here some examples of “Learning Situations” focused on different thematic, in order to make the use of this methodological guide as practical and simple as possible.

The objective is to illustrate through examples the versatility of the Service-Learning methodology in its application to climate action and the much-needed ecological and energy transition. The examples have been proposed for a specific context, setting and target group, but we believe that they can be easily adapted to other educational levels and situations.

The main sections and aspects included when describing the learning situations are as follows:

- **Identifying data:** title, level/s, timing
- **Justification and contextualization:** objectives, needs (identifying specific problems within the local community), expected benefits...
- **Curricular concretion:** specific competences, evaluation criteria and basic knowledge
- **Methodology:** mainly SERVICE-LEARNING METHOD (but it may be complemented by other educational techniques)
- **Implementation and didactic sequencing:**
 - Activities and tasks, distribution in sessions
 - Grouping: organization of students and groups
 - Schedule, organization of time
 - Spaces, materials and resources necessary
 - Dissemination actions and material
- **Sustainability:** ways to maintain and expand the project over time.
- **Evaluation:** expected evaluation of the results

The Learning situations on the topic of the climate challenge have been structured around the lines of action of the European Green Deal:

1. CLEAN ENERGY
2. CIRCULAR ECONOMY - SUSTAINABLE INDUSTRIALIZATION
3. EFFICIENT AND SUSTAINABLE BUILDING
4. SUSTAINABLE AGRICULTURE AND FOOD
5. SUSTAINABLE MOBILITY
6. POLLUTION CONTROL
7. PROTECTING BIODIVERSITY AND FORESTS



2.2 PRACTICAL EXAMPLES OF LEARNING SITUATIONS BASED ON THE SERVICE-LEARNING METHOD



Learning situation 1

(CLEAN ENERGY)

“EMPOWERING FUTURES: CLEAN ENERGY AWARENESS AND ACTION”

LEVELS: Primary and Secondary

TIMING: The whole school year (September to June). 5 sessions (approximately 1 session per 1-2 months)

JUSTIFICATION AND CONTEXTUALIZATION:

The escalating impacts of climate change, energy scarcity, and environmental degradation have made the transition to clean energy sources a global imperative. As the world grapples with the consequences of fossil fuel reliance—ranging from extreme weather events to health hazards and economic instability—there is a critical need for education that empowers the next generation to understand, advocate for, and implement sustainable energy solutions. “Empowering Futures: Clean Energy Awareness and Action” aims to address this need by providing students with a comprehensive understanding of clean energy concepts and the skills necessary to promote and utilize these technologies within their communities.

Globally, the shift towards renewable energy is supported by international agreements such as the Paris Agreement, which emphasizes the need for countries to reduce greenhouse gas emissions and limit global warming to well below 2 degrees Celsius. This project aligns with these global objectives by fostering awareness and understanding of clean energy technologies—such as solar, wind, hydro, and geothermal energy—among students. As future leaders and decision-makers, students will be equipped to contribute to these efforts and advocate for policies that support sustainable energy solutions.

Locally, many communities are affected by the impacts of climate change, including rising temperatures, increased flooding, and unpredictable weather patterns. These challenges create an urgent need for local solutions that can mitigate environmental impacts and enhance community resilience. By contextualizing clean energy education within local environmental issues, the project encourages

students to identify and address the specific energy challenges faced by their communities. Students will engage in hands-on activities, research local clean energy initiatives, and propose solutions tailored to their context, making the learning experience both relevant and impactful.

From an educational perspective, the project promotes interdisciplinary learning, integrating science, technology, engineering, and mathematics (STEM) with social studies and civic responsibility. Students will not only gain knowledge about clean energy technologies but also develop critical thinking, problem-solving, and collaboration skills. Engaging students in discussions about energy efficiency, resource management, and environmental stewardship fosters a sense of agency and responsibility, empowering them to take action in their communities.

Additionally, the project aims to cultivate a culture of advocacy among students. By encouraging them to communicate and present their findings to peers, educators, and community members, students will learn the importance of effective communication in driving change. This not only educates students about clean energy but also empowers them to become advocates for sustainable practices, inspiring their families and communities to adopt cleaner energy solutions.

Benefits for local:

- Promotes greater awareness of clean energy issues within the community, leading to a more informed population that understands the importance of sustainable energy practices.
- Increased adoption of clean energy technologies can lead to a decrease in air and water pollution, resulting in better public health outcomes for the community.
- Transitioning to renewable energy sources can help protect local ecosystems and biodiversity by reducing the environmental degradation associated with fossil fuel extraction and consumption.
- By promoting clean energy initiatives, the project can contribute to the development of local green jobs in areas such as renewable energy installation, maintenance, and energy efficiency consulting.
- Increased awareness of energy-efficient practices can lead to reduced energy consumption and lower utility bills for households and businesses within the community.
- Encourages partnerships with local governments, businesses, and organizations focused on sustainability, fostering collaboration and resource sharing.
- Contributes to a cultural shift towards sustainability, where community members adopt more conscious energy practices and prioritize environmentally friendly choices in their daily lives.

General Objectives:

- To raise awareness among students about the importance of clean energy and its role in combating climate change and promoting sustainability.

- To instill a sense of environmental responsibility and advocacy, empowering students to take action within their communities regarding energy use and conservation.

Specific Objectives:

1. Students will understand key concepts related to clean energy sources, including solar, wind, hydro, and geothermal energy, along with their benefits and challenges.
2. Learn about the environmental impacts of fossil fuels and the significance of transitioning to renewable energy.
3. Students will analyze local energy consumption patterns and identify opportunities for improvement and implementation of clean energy solutions within their communities.
4. Students will evaluate the feasibility and effectiveness of different clean energy technologies in addressing local energy needs and environmental challenges.
5. Engage in hands-on projects that involve designing energy-efficient solutions or clean energy systems relevant to their school or community.
6. Simulations or experiments that demonstrate the principles of renewable energy technologies, such as solar panel assembly or wind turbine construction.
7. Students will collaborate in groups to research clean energy initiatives and develop presentations that communicate their findings to peers and community members.
8. Students will propose actionable recommendations for local clean energy projects and initiatives based on their research and analysis.
9. Explore the concept of sustainability and how clean energy technologies contribute to sustainable development goals.

CURRICULAR CONCRETION:

Specific Competences:

- **Knowledge and Understanding:** Understand various clean energy sources (solar, wind, hydro, geothermal, and biomass).
- **Critical Thinking:** Analyze the advantages and disadvantages of different energy sources.
- **Problem-Solving:** Design a simple renewable energy project or solution for the school or community.
- **Communication:** Present findings and proposals effectively to peers and stakeholders.
- **Teamwork:** collaboration skills to address environmental problems.

Evaluation Criteria:

- Demonstrated understanding of clean energy concepts through quizzes and discussions.
- Quality and feasibility of renewable energy projects designed by students.
- Clarity, engagement, and effectiveness of student presentations.
- Active involvement in group work and discussions.

Basic Knowledge

- **Types of Clean Energy:** Definitions and examples of solar, wind, hydro, geothermal, and biomass energy.
- **Environmental Impact:** How clean energy reduces greenhouse gas emissions and pollution.
- **Economic Factors:** Cost-effectiveness and job creation in the clean energy sector.
- **Global Initiatives:** Overview of international agreements and local policies promoting clean energy.

METHODOLOGY:

- **Service-Learning Method:** Students will engage in practical activities to address waste pollution and climate change issues in the municipality, working in partnership with the local community at different stages of the programme with the aim of sharing learning and experiences and resulting in concrete and real community services and benefits.
- **Other educational techniques:** Project-based learning, guided visits to renewable energy facilities, talks with environmental and energy experts, debates and research on the impact of nonrenewable energies, artistic and creative activities to communicate solutions and raise public awareness.



IMPLEMENTATION AND DIDACTIC SEQUENCING

Phase 1: Introduction to Clean Energy (1 week)

- Class discussions on energy consumption and environmental issues.
- Introduction to different clean energy sources through videos and presentations.

Phase 2: Research and Exploration (2 weeks)

- Students research a specific clean energy source and its applications.
- Group discussions to share findings and perspectives.

Phase 3: Project Design (2 weeks)

- Students work in groups to design a clean energy solution for their school or community.
- Develop a project plan, including objectives, materials needed, and implementation steps.

Phase 4: Presentation and Feedback (1 week)

- Groups present their projects to the class and invited stakeholders (local community members, school administration...).
- Peer and teacher feedback sessions to encourage constructive criticism.

Phase 5: Reflection and Action (1 week)

- Reflective writing assignments where students discuss what they learned and how they can contribute to clean energy initiatives.
- Encourage students to implement small changes in their daily lives to support clean energy.

SUSTAINABILITY:

- Encouraging students to consider the long-term impacts of energy choices on the environment.
- Fostering a mindset of conservation and responsible consumption.
- Highlighting community involvement in clean energy initiatives, leading to sustainable practices at the local level.
- Creating a platform for ongoing discussions about energy efficiency and renewable resources beyond the classroom.
- Building partnerships with local institutions, enterprises and environmental and climate organisations to sustain the project in the long term and promote continued climate action.

EVALUATION:

- Ongoing assessments through quizzes, class participation, and group discussions to gauge understanding.
- Evaluation of the final projects based on a rubric that considers creativity, practicality, presentation skills, and research depth.
- Students assess their contributions and those of their peers to encourage accountability and teamwork.

Feedback Mechanism:

- Provide constructive feedback throughout the project phases to help students improve their projects and understanding.
- Conduct post-project surveys to gather insights from students about their learning experience and suggestions for future projects.





Learning situation 2

(CLEAN ENERGY) “SAVING ENERGY – GETTING ENERGY”

LEVELS: Students of all levels

TIMINGS: whole year project

JUSTIFICATION AND CONTEXTUALIZATION:

In a public building, like a school, there is a very high energy consumption. This is due to lighting, heating, and cooling, using digital technologies, cooking, and energy loss. To fight against this problem the whole school community needs to be involved and collaborate. The school management, the local community or the school community can save energy and raise environmental awareness by changing practices at school or in households.

When students understand what they can do to preserve the environment, they can take their practice home and change theirs and their family behaviour. They can also raise awareness to the necessity of assuring their future by saving energy and consuming other types of energy like clean energy.

By creating a best practice guide, they guarantee the necessary best practice environmental preservation information to the local community and become active citizens fighting for the environment and for their future wellbeing.

Objectives:

This project aims at:

- Raising awareness to the necessity of reducing energy consumption and gases emission.
- Finding out the school's energy footprint.
- Learning how to use energy in an efficient way.
- Acquiring knowledge on clean energy and its importance to environmental preservation.
- Creating an energy consumption best practice handbook to share to the whole community.

- Developing active citizenship and environmental awareness.
- Involving families and other community members in students learning process.
- Combining formal and non-formal learning.

METHODOLOGY:

- Service-Learning Method: Students will engage in practical activities working in partnership with the local community at different stages of the programme with the aim of sharing learning and experiences and resulting in concrete and real community services and benefits.
- Other educational techniques will be also used.

IMPLEMENTATION AND DIDACTIC SEQUENCING	
Task 1: Work organization - First term	<ul style="list-style-type: none"> • Learning about energy, economic, and environmental performance. • Organizing groups: each group is assigned a specific energy consumption area to register the data related to the school energy consumption and the consumption in students' households through energy consumption invoices and registers. • Creating data collecting instruments and consumption calculator indicators.
Task 2: Field work/data collecting - First term	<ul style="list-style-type: none"> • Collecting data within the community: preparing and applying questionnaires to the community to learn about their energy and water consumption.
Task 3: Analysis of collected data – Second term	<ul style="list-style-type: none"> • Using the created tools for data processing. • Verifying the consumption of energy by area and between households and the school. • Presenting data, determining the energetical performance indicators.
Task 4: Dissemination to the community – Second term	<ul style="list-style-type: none"> • Creating dissemination tools like posters, charts, and graphs with the collected data analysis to present to the community in which school and community can observe and analyze their results.

Task 5: Improvement areas – Third term

- Establishing ways to improve energetic efficiency either at school or within the school community.
- Determining school consumption goals to reduce its energy footprint.
- Defining households' energetic consumption goals with the collaboration of families and local organizations.

Task 6: Creation of a best practice handbook – Third term

- Researching on clean energy consumption.
- Applying knowledge acquired to organize and create a best practice handbook.
- Campaigning and raising awareness for the consumption of clean energy

SUSTAINABILITY:

The project can be applied every school year, count on the collaboration of the local community, and can be made regional or even spread around the country to be applied in other school and communities.

EVALUATION:

The evaluation will take place at the end of each term through questionnaires applied to the students and the local community and at the end of it, after the dissemination to the community and every 3 months to find out about the environmental changes within the local community.





Learning situation 3

(CIRCULAR ECONOMY- SUSTAINABLE INDUSTRIALIZATION) “SECOND CHANCE MARKET”

LEVELS: Students of all levels.

TIMINGS: The project will be developed between the beginning and the end of the school year, but it can and should continue in consecutive years and be undertaken as a school project.

JUSTIFICATION AND CONTEXTUALIZATION:

Circular economy is a production and consumption model that involves sharing, renting, reusing, repairing, renewing, and recycling existing materials and products, while possible. Under this model the products lifecycle is enlarged, and the waste is reduced or eliminated. The linear economy paradigm, based on the principle of “producing-using-throwing away”, is obsolete and an enemy of the Earth. Reducing, reusing, and recycling is the new paradigm against wasting, resources scarcity and the introduction of a new consumerism rational into our societies.

In this second opportunity market, the already used and not wanted goods will be handed out to someone else so that they can be reused by other consumers/owner in a reusing logic according to the principles of the circular economy. For this, at the handing out moment, an amount is established for the product and the owner will be given a voucher containing “exchange currency” so that they can “buy” other products in this market.

Objectives:

This project aims at:

- making the students real agents of change through their action within the family and the community.
- developing students’ awareness to the necessity of saving the planet’s resources.
- motivating the students to consumption habits and life patterns that lead to the mitigation of the climate change.

- promoting environmental behaviors in students so that they become conscious, active, and informed citizens, capable of facing the environmental crisis that the planet is going through.
- involving families and other community members in students' learning process.
- raising awareness to the necessity of recycling and reusing.
- combining formal and non-formal learning

METHODOLOGY:

The involvement of students' families and the school community in activities led by students, leads to a learning process in which they are active participants in this process and in the development of civic competences to promote common good.

This learning methodology is for students an educational experience that at the same time provides them with the role of active citizens, developing their skills and being at the service of a community. Therefore, surely it will translate into more significant learning.

IMPLEMENTATION AND DIDACTIC SEQUENCING

Task 1: Preparation – first term

- Distribution of tasks and timetables:
 1. Who gets the products and at what time.
 2. Who settles the products price.
 3. Who catalogs and stores them.
 4. Who makes the products available and at what time.
 5. Who registers digitally the entry of new products, the exits, and the products in the warehouse.

Task 2: Defining currency – first term

- Exchange currency definition

Task 3: Voucher creation and printing – second term

- Creation of vouchers of different amounts of “exchange currency” (multiples of 5 until 100)

Task 4: What products? – second term

- Decision about the product types (clothes, books, toys, digital games, calculators, etc.) possible to be exchanged in the “second chance market” by students, their families, and other school community members.

Task 5: The warehouse – third term

- Organization of a space for reception, selection, cataloguing, storing and exchange of the received products by the “exchange currency”.

Task 6: Products online dissemination – third term

- Creation of an online catalogue and definition of the communication means used in its dissemination (websites, social media, etc.)

SUSTAINABILITY:

The “Second chance market” will first be hold at school involving the members of the school community and can be expanded to the local community, thus contributing to the enlargement of the products variety and for their reinvigoration.

EVALUATION:

The evaluation will take place monthly through meetings to assess the quantity of exchanged goods, by creating data series that allow monthly/yearly comparisons.

Students will also answer to questions, created by themselves under teacher’s supervision, in which they deal with the differences between linear and circular economy and the importance of circular economy to fight against waste and to the preservation of the Earth’s resources.





Learning situation 4

(CIRCULAR ECONOMY- SUSTAINABLE INDUSTRIALIZATION) **“TRANSFORMING LOCAL TEXTILE WASTE INTO A SUSTAINABLE BUSINESS”**

LEVELS: Secondary Education (Ages 14-16).

TIMINGS: 10 weeks (2 sessions per week, 90 mins per session).

JUSTIFICATION AND CONTEXTUALIZATION:

Objectives:

- To understand the environmental impact of the textile industry, focusing on waste.
- To analyse the potential for transforming textile waste into valuable products through a circular economy model.
- To engage with local textile businesses and community members in developing sustainable solutions.

Needs:

- The local community has a textile manufacturing sector, which produces a large amount of waste.
- There is a lack of awareness and infrastructure for recycling or repurposing textile waste in the community.
- Students need to gain hands-on experience in sustainable practices and community engagement.

Expected Benefits:

- Reduction of textile waste in the local community through innovative repurposing solutions.
- Enhanced collaboration between students, local businesses, and community members on sustainability initiatives.
- Development of entrepreneurial and technical skills among students.

CURRICULAR CONCRETION:

Specific Competences:

- Knowledge of the environmental impacts of the textile industry.
- Ability to apply circular economy principles to real-world problems.
- Development of entrepreneurial skills through the creation of sustainable business models.

Evaluation Criteria:

- Successful identification of textile waste issues in the local community.
- Development of viable solutions for repurposing or recycling textile waste.
- Quality of the final business proposal and its presentation to local stakeholders.

Knowledge:

- Basics of circular economy and sustainable industry.
- Environmental science related to textile production and waste.
- Principles of entrepreneurship and business planning.

METHODOLOGY:

Students will collaborate with local textile businesses to identify waste management challenges and explore circular economy opportunities. They will work in teams to develop sustainable business models for repurposing textile waste, such as upcycling or creating new products. The project will include practical workshops on textile recycling, business planning, and community engagement.

IMPLEMENTATION AND DIDACTIC SEQUENCING

Week 1-2: Understanding the Textile Waste Problem

Activities: Interactive lectures on the environmental impact of the textile industry, analysis of local textile waste data.

Task: Conduct a survey or research on textile waste production in local businesses.

Week 3-4: Field Investigation and Data Collection

Activities: Field trips to local textile factories, interviews with business owners, and community stakeholders.

Task: Collect data on the types and amounts of textile waste produced and existing waste management practices.

<p>Week 5: Problem Identification and Ideation</p> <p>Activities: Brainstorming sessions, SWOT analysis of current waste management practices.</p> <p>Task: Identify specific textile waste issues that could be addressed through a circular economy approach.</p>
<p>Week 6-7: Developing Sustainable Solutions</p> <p>Activities: Design thinking workshops, prototyping sessions.</p> <p>Task: Develop a business model for repurposing textile waste, such as creating new products from scrap materials or setting up a textile recycling program.</p>
<p>Week 8: Community Involvement and Feedback</p> <p>Activities: Organise a community forum to present initial ideas and gather feedback from local businesses and residents.</p> <p>Task: Refine the business model based on community input.</p>
<p>Week 9: Finalising the Proposal and Preparation for Presentation</p> <p>Activities: Final project work, creation of presentation materials (e.g., posters, business plan documents).</p> <p>Task: Prepare a comprehensive business proposal and a presentation for local stakeholders.</p>
<p>Week 10: Presentation and Dissemination</p> <p>Activities: Public presentation event at the school or community centre, distribution of informational brochures and posters.</p> <p>Task: Present the final business proposal to local textile businesses, community leaders, and other stakeholders.</p>

Involvement of the Community:

- Local textile businesses will be involved in the data collection, feedback, and implementation stages.
- Community members will be invited to the presentation and encouraged to participate in the forum.

Grouping:

- Students will be organised into teams of 4-5, with each team focusing on a specific aspect of the project (e.g., research, design, community engagement).
- Each team will collaborate with a specific local business or community group.

Schedule:

- Sessions will be held twice a week, each lasting 90 minutes.
- Field trips and community forums will be scheduled during school hours, with additional time allocated as needed.

Spaces, Materials, and Resources:

- Classrooms for planning and group work.
- School workshop for prototyping and hands-on activities.
- Community spaces (e.g., local businesses, town hall) for field trips and presentations.

Materials:

- Computers, fabric and textile waste samples, projectors, transportation for field trips.

Dissemination Actions and Material:

- Project website or blog to share progress and outcomes.
- Social media campaigns targeting local community members and businesses.
- Press releases to local media outlets and school newsletters.

SUSTAINABILITY

- Set up an annual textile waste reduction initiative in the school.
- Establish ongoing partnerships between the school and local textile businesses for future sustainability projects.
- Develop a toolkit or guide for other schools to replicate the project in their communities.

EVALUATION

Evaluation of the Service:

- Assess the feasibility and impact of the proposed business models on the local textile industry.
- Gather feedback from local businesses and community members on the effectiveness of the proposed solutions.

Evaluation of Students' Learning:

- Continuous formative assessment through observation of student participation, teamwork, and problem-solving.
- Summative assessment based on the final business proposal, presentation, and the quality of engagement with community stakeholders.
- Peer and self-assessment to reflect on individual contributions and learning experiences.



Learning situation 5

(CIRCULAR ECONOMY- SUSTAINABLE INDUSTRIALIZATION) **“SUSTAINABLE HOSPITALITY: NAVIGATING THE CIRCULAR ECONOMY”**

LEVELS: Secondary Education

TIMINGS: Full Academic Year Program

JUSTIFICATION AND CONTEXTUALIZATION:

“Sustainable Hospitality: Navigating the Circular Economy “ is an innovative educational program designed to immerse secondary school students in the exploration of sustainable and circular practices within the Hospitality industry. Students will embark on a journey through the world of sustainable hospitality, with a focus on the principles of the circular economy. Hospitality is a vital industry with significant environmental impacts, making it crucial to explore innovative approaches to sustainability. Through engaging lessons and practical exercises, students will discover how the circular economy can revolutionize the hospitality sector by minimizing waste, maximizing resource efficiency, and enhancing overall environmental performance.

The class will delve into various aspects of sustainable hospitality, including sustainable food practices, waste reduction strategies, energy conservation, and eco-friendly hotel design. Students will analyze case studies of hotels and restaurants implementing circular economy principles, exploring how these businesses integrate sustainability into their operations while delivering exceptional guest experiences.

Furthermore, students will examine the economic and social benefits of embracing circularity in hospitality, such as cost savings, improved brand reputation, and positive community engagement. They will also explore the role of technology and innovation in driving sustainable practices within the industry.

By the end of the class, students will gain an understanding of how the circular economy can transform the hospitality sector, empowering them to envision and create a more sustainable future for the industry. Through critical thinking and creativity, they will be inspired to pursue careers in hospitality that prioritize environmental stewardship and social responsibility.

The hospitality sector is a significant contributor to global environmental degradation, with its intensive resource consumption, waste generation, and carbon emissions. Secondary education students must understand the principles of sustainability and the circular economy within the context of hospitality. By integrating these concepts into their education, students will be better equipped to address environmental challenges, drive innovation, and contribute to the creation of a more sustainable and resilient hospitality sector.

CURRICULAR CONCRETION:

The class will be structured around key themes and topics relevant to sustainable hospitality and the circular economy. This includes:

- Introduction to Sustainable Hospitality and Circular Economy Principles
- Sustainable Food Practices in Hospitality
- Waste Reduction and Recycling Strategies
- Energy Efficiency and Renewable Energy Solutions
- Sustainable Design and Architecture in Hospitality
- Case Studies and Best Practices in Sustainable Hospitality Each theme will be explored through a combination of lectures, group discussions, case studies, and hands-on activities.

METHODOLOGY:

The teaching methodology will blend Service-Learning Method (SLM) with project-based learning, encouraging students to take the lead in their educational journey. Through collaboration with local Hospitality businesses and environmental organizations, students will gain hands-on experience and real-world insights into the challenges and opportunities of transitioning to sustainable practices.

IMPLEMENTATION AND DIDACTIC SEQUENCING:

The class will be implemented over a semester or academic year, with each theme introduced and explored sequentially. The didactic sequencing will follow a logical progression, starting with foundational concepts and gradually building upon them to delve deeper into specific topics and applications. This will ensure that students develop a comprehensive understanding of sustainable hospitality and the circular economy while also allowing flexibility for interdisciplinary connections and integration with other subjects.

The students will have the opportunity to conduct sustainability audits of nearby businesses, evaluating practices and suggesting improvements. Then, they organize workshops on sustainable food practices and energy efficiency, engaging entrepreneurs and employees to implement changes. Finally, they will volunteer in clean-up events, increasing their environmental awareness and civic responsibility among residents and tourists. Through these activities, students gain hands-on experience, develop critical skills, and contribute to building a more sustainable future for their community.

SUSTAINABILITY:

Sustainability will be integrated into every aspect of the class, from the content covered to the materials used and the activities undertaken. Students will be encouraged to reflect on the environmental, economic, and social implications of their learning and actions, fostering a holistic understanding of sustainability.

EVALUATION:

Evaluation will be based on a combination of assessments, including exams, presentations, projects, and reflective essays, with an emphasis on critical thinking, creativity, and application of knowledge to real-world contexts. Additionally, feedback from students, stakeholders, and community partners will be sought throughout the class to continuously improve and adapt the curriculum to meet evolving needs and challenges in sustainable hospitality and circular economy.

By focusing on sustainable hospitality and the circular economy, the “Sustainable Hospitality: Navigating the Circular Economy” programme seeks to instill a deep understanding of environmental stewardship, social responsibility, and economic viability within the context of hospitality operations. Through interactive learning experiences and practical applications, students will be inspired to envision and create a more sustainable and resilient future for the planet, driving positive impacts on both local and global scales. Ultimately, the aim is to cultivate a new generation of attained individuals who are committed to driving creativity and innovation, along with sustainable practices, and making a positive difference in the world.



Learning situation 6

(EFFICIENT AND SUSTAINABLE BUILDING) “DESIGNING ENERGY EFFICIENT SPACES”

LEVELS: Primary, 5th-6th grades (11 and 12 years old) - Secondary 1st-4th grades (13-16 years old).

TIMING: The whole school year (September to June). 18 sessions (approximately 2 sessions per month).

JUSTIFICATION AND CONTEXTUALISATION:

Energy-efficient buildings play a crucial role in the fight against climate change and in the quest for sustainable urban development. As urban areas continue to expand and populations grow, the demand for energy increases, leading to higher greenhouse gas emissions and environmental degradation. “Designing Energy Efficient Spaces“ aims to educate students about the principles of energy efficiency in building design, construction, and operation, emphasizing its vital importance in promoting a sustainable future.

Contextualizing Energy Efficiency

Local Environmental Challenges: Many communities face pressing environmental issues, such as air pollution, urban heat islands, and increased energy costs. By contextualizing energy efficiency within these challenges, students gain a better understanding of how building practices can mitigate these problems. For instance, energy-efficient buildings can significantly reduce the demand for energy and lower emissions, contributing to cleaner air and a healthier living environment.

Global Sustainability Goals: The project aligns with global sustainability frameworks, such as the United Nations Sustainable Development Goals (SDGs), particularly Goal 11 (Sustainable Cities and Communities) and Goal 13 (Climate Action). Students will learn how energy-efficient buildings contribute to these goals by reducing energy consumption, promoting sustainable practices, and enhancing the quality of life in urban areas.

Educational Objectives

Students will explore various aspects of energy efficiency, including architectural design, materials selection, and renewable energy integration. They will learn how these factors influence energy consumption and overall building performance, providing them with a comprehensive understanding of sustainable building practices.

By analyzing case studies of local buildings and evaluating their energy performance, students will develop critical thinking skills. They will assess the effectiveness of existing building practices and propose innovative solutions to enhance energy efficiency in their communities.

Empowers students to think critically about their environment and inspires them to advocate for energy-efficient practices in their communities. By engaging in hands-on projects and community discussions, students will become effective advocates for sustainable building practices, promoting awareness among their peers and local residents.

By equipping students with knowledge and skills related to energy efficiency, the project aims to create a generation of informed citizens who prioritize sustainable practices in their personal and professional lives. This long-term impact contributes to a cultural shift towards sustainability, where energy efficiency becomes a fundamental consideration in future development projects.

CURRICULAR CONCRECTION:

Competences:

Understand the principles of energy efficiency in building design and construction.

- Evaluate the energy efficiency of different building materials and technologies.
- Design an energy-efficient building plan that meets specific sustainability goals.
- Effectively present design ideas and justify choices based on energy efficiency criteria.

Evaluation Criteria:

- Demonstrated understanding of energy efficiency concepts through quizzes and class discussions.
- Creativity, practicality, and adherence to energy efficiency guidelines in building designs.
- Clarity, engagement, and effectiveness of presentations on building designs.
- Active involvement in group projects and discussions.

Basic knowledge:

- Definitions, benefits, and technologies related to energy-efficient buildings.
- Overview of sustainable materials and their energy-saving properties.
- Key principles of passive solar design, insulation, and energy-efficient systems (heating, cooling, lighting).
- Introduction to local building codes and energy efficiency standards.

METHODOLOGY:

- Service-Learning Method: Students will engage in practical activities to identify energy efficiency in building and structural issues in the municipality, working in partnership with the local community at different stages of the programme with the aim of sharing learning and experiences and resulting in concrete and real community services and benefits.
- Other educational techniques: Project-based learning, guided visits to public building with energy efficiency examples, talks with technicians and experts, debates and research on the impact of inadequate energy efficiency, artistic and creative activities to communicate solutions and raise public awareness.

IMPLEMENTATION AND DIDACTIC SEQUENCING
<p>Phase 1: Introduction to Energy Efficiency (1 week)</p> <ul style="list-style-type: none"> • Interactive lectures introducing foundational concepts of energy efficiency, its importance, and its role in combating climate change. • Watch videos showcasing innovative energy-efficient buildings and technologies to inspire students.
<p>Phase 2: Research and Exploration (2 weeks)</p> <ul style="list-style-type: none"> • Students conduct research on various energy-efficient building materials, technologies, and strategies. • Facilitate discussions to share findings, analyze best practices, and explore local examples of energy-efficient buildings.
<p>Phase 3: Design Challenge (3 weeks)</p> <ul style="list-style-type: none"> • Students work collaboratively to design an energy-efficient building tailored for a specific purpose (e.g., school, community center). • Create comprehensive building plans that include energy-efficient features, materials, and sustainability measures.

Phase 4: Presentation and Feedback (1 week)

- Groups present their building designs to the class and invited stakeholders (e.g., local architects, community leaders, local experts, etc..).
- Organize peer and teacher feedback sessions to encourage constructive criticism and foster discussion about design choices.

Phase 5: Reflection and Community Engagement (1 week)

- Assign reflective essays where students discuss what they learned about energy efficiency and its potential impact on their community.
- Encourage students to participate in or volunteer for local initiatives or projects related to energy efficiency.

Phase 6: Field Visits and Practical Learning (2 weeks)

- Organize visits to local energy-efficient buildings, such as green schools or community centers, to observe real-world applications.
- Invite industry professionals to speak to students about their experiences and insights regarding energy-efficient building practices.

Phase 7: Hands-On Workshops (2 weeks)

- Conduct hands-on workshops where students can experiment with energy-efficient building materials, insulation, and renewable technologies.
- Focus on practical skills such as calculating energy efficiency, understanding building codes, and using design software.

Phase 8: Community Awareness Campaign (2 weeks)

- Students design a community awareness campaign focused on the importance of energy efficiency in buildings.
- Execute the campaign by creating informational materials, hosting events, or utilizing social media to reach a broader audience.

Phase 9: Final Evaluation and Impact Assessment (1 week)

- Assess the overall effectiveness of the learning situation based on student engagement, knowledge gained, and community impact.
- Collect feedback from students, teachers, and community stakeholders to evaluate the strengths and areas for improvement in the project.

SUSTAINABILITY:

The project promotes sustainability by:

- Educating students about the importance of energy-efficient buildings in reducing carbon footprints and conserving resources.
- Encouraging responsible consumption and use of sustainable materials in construction.
- Fostering community awareness and engagement in energy efficiency initiatives.
- Providing students with tools to advocate for energy-efficient practices in their homes and communities.

EVALUATION:

- Formative Assessment: Ongoing assessments through quizzes, class participation, and group discussions to gauge understanding of energy efficiency concepts.
- Summative Assessment: Evaluation of final building designs based on a rubric that considers creativity, practicality, adherence to energy efficiency guidelines, and presentation quality.
- Self and Peer Assessment: Students assess their contributions and those of their peers to encourage accountability and teamwork.

Feedback Mechanism

- Provide constructive feedback throughout the project phases to help students improve their designs and understanding.
- Conduct post-project surveys to gather insights from students about their learning experience and suggestions for future projects.





Learning situation 7

(SUSTAINABLE AGRICULTURE & FOOD. FARM TO FORK) **“SUSTAINABLE PATHWAYS: FROM FARM TO FORK”**

LEVELS: Secondary Level

TIMINGS: Full Academic Year Program

JUSTIFICATION AND CONTEXTUALIZATION:

The “Sustainable Pathways: From Farm to Fork” initiative aims to enlighten secondary school students about the importance of sustainable farming practices and the impact of food production and consumption on the environment. This educational endeavor seeks to foster a deep understanding of how individual choices can contribute to a healthier planet and community.

Greece has a wide range of locally resourced products, as well as established local open markets that run on various locations around the country on set dates. The practice of Farm to Fork is embedded in the culture. However, these markets are primarily used by elderly people and not younger ones. Additionally, while many products are resourced locally, many supermarket chains elect to supply customers with products from different geographic locations due to ease, larger quantities or lower prices. This raises carbon the carbon footprint of the shopper, without them realizing. The two problems that we will therefore address is the dwindling use of local open markets, and the awareness of the environmental impact of choosing locally sourced foods.

The initiative addresses specific problems within the local community, such as a significant carbon footprint due to food transportation, a general lack of awareness regarding sustainable agriculture, and limited access to locally sourced foods. By engaging students in this program, we expect to see a myriad of benefits, including increased environmental awareness, strengthened local economy through support of local farms, and an improvement in community health standards due to healthier eating habits. The objective is to address the two problems mentioned, and specifically, by the end of the curriculum to have participants:

- Know the value of locally sourced food, as well as be aware of how to identify and find it.
- Be conscious consumers, thoroughly aware and conscious of the environmental impact of food choices from local and non-local foods.

CURRICULAR CONCRETION:

The curriculum is designed to imbue students with a comprehensive understanding of ecosystem dynamics in agriculture, the ability to critically analyze the environmental impacts of food production and consumption, and the skills necessary to plan and prepare meals that are both sustainable and nutritious. Evaluation will be based on students' active participation in discussions and activities, their ability to apply theoretical knowledge in practical contexts, and their contributions to project-based learning assignments that seek to solve real-world problems identified within their community.

METHODOLOGY:

The program will adopt the Service-Learning method (SLM), supplemented by other educational techniques to accommodate diverse learning styles and enhance student engagement. This approach ensures that students are at the center of the learning process, actively participating in their educational journey and applying their knowledge in meaningful ways.

IMPLEMENTATION AND DIDACTIC SEQUENCING:

Activities and tasks will be distributed across the academic year, with careful consideration given to the involvement of the community at all stages of the program. The organization of students into groups will facilitate cooperative learning and peer education, while the schedule and organization of time will be designed to maximize learning outcomes without overwhelming participants. Essential resources, such as local farm visits, workshops with agricultural experts, and cooking demonstrations with local chefs, will be integral to the program. Additionally, dissemination actions, such as community presentations and the creation of educational materials, will help to spread awareness and engage a broader audience.

Specific activities:

Students will be required to keep a record of foods purchased by their family throughout the week. They will then identify which of the foods are not locally sourced but could be, as well as where they could be purchased from. While there is no established footprint calculator to measure the change, students will be tasked with calculating the distance traveled for the foods they have swapped. We will then have the students write down the percentage of foods that were changed and where they were sourced from and the total travel distance that was reduced due to that. A final report will be written detailing the overall amount of locally sourced foods that were swapped, as well as the total kilometers saved through locally sourced through the project.

Specific Activities and groups involved:

Families: The parents of the students will be actively involved throughout the project due to the nature of the proposed activities above. This will be a learning experience for them as well from the beginning. Additionally, the families of the

students will be involved in a workshop designed and delivered by the students, who will present their findings and the implementation strategies that they have used during their project activities. The families will work alongside their children to further suggest ways to implement Farm-to-Fork solutions within the family, taking things like cost and time into consideration. These suggestions will be compiled and used as an output available to all participants and stakeholders.

Local community:

A joint activity will be organized with a local food market in which the students will visit the market and organize an event to promote the sustainable nature of it. In Greece, open markets are traditionally chosen due to their lower prices and better-quality materials; many people do not actually know that they are also more sustainable. Therefore, we will aim to showcase the purpose of a traditional market in a modern sustainable context.

Local Area:

The students will also be involved in an event organized and delivered by them with the help of New York college, similar to the one they will deliver to their families, but less interactive. Local organizations and stakeholders will attend.

SUSTAINABILITY:

The project is designed with sustainability at its core, not only in terms of content but also in ensuring its longevity and relevance. Strategies for maintaining and expanding the project will include forming partnerships with local farms, securing funding through grants and community fundraising, and integrating the program into the school's permanent curriculum.

EVALUATION:

The success of the program will be measured through both qualitative and quantitative means, including pre- and post-program surveys to assess changes in knowledge and attitudes, evaluations of student projects and presentations, and feedback from community partners. The goal is to achieve a holistic understanding of the program's impact on students' learning and its broader effects on the community's sustainability practices. By the end of the academic year, "Sustainable Pathways: From Farm to Fork" aims to cultivate a cohort of informed, environmentally conscious students who are empowered to make choices that benefit both their health and the planet.



Learning situation 8

(SUSTAINABLE AGRICULTURE & FOOD. FARM TO FORK) **“LOCAL FOODS, HEALTHY PLANET”**

LEVELS: Primary Education (Ages 9-11)

TIMINGS: 8 weeks (2 sessions per week, 60 minutes per session)

JUSTIFICATION AND CONTEXTUALIZATION:

Objectives:

- To introduce students to sustainable agriculture and the “Farm to Fork” concept by engaging them with local food production.
- To teach students about where food comes from and the importance of sustainable practices in farming.
- To involve students in growing their own food at home and understanding the food supply chain through practical, hands-on activities.

Needs:

- Primary students often have limited knowledge of how food is grown and the environmental impact of their food choices.
- There is a need to foster early environmental responsibility and healthy eating habits among students.

Expected Benefits:

- Increased awareness of sustainable food practices and local food production among students.
- Hands-on experience in growing food, which promotes responsibility and a connection to nature.
- Engagement with local farmers, which strengthens community ties and supports local agriculture.

CURRICULAR CONCRETION:

Specific Competences:

- Understanding the basics of sustainable farming and the journey of food from farm to fork.
- Developing observation, problem-solving, and teamwork skills through practical activities.
- Enhancing communication skills by sharing knowledge with peers and the local community.

Evaluation Criteria:

- Ability to explain the process of food production and the importance of sustainability.
- Active participation in home gardening and farm visits.
- Quality of student reflections and presentations on their experiences.

Basic Knowledge:

- Basic plant biology and the role of farming in food production.
- The environmental impact of different farming practices.
- The importance of local food and reducing food waste.

METHODOLOGY:

- Students will engage with the local food system by visiting a nearby egg farm to learn about sustainable farming practices.
- They will be given seeds to grow their own herbs at home, such as cress, and will track their plants' growth in a journal.
- The project will include practical activities that connect classroom learning with real-world food production.

IMPLEMENTATION AND DIDACTIC SEQUENCING

Week 1: Introduction to Sustainable Food

Activities: Read a story or watch a video about where food comes from and discuss sustainable farming practices.

Task: Students draw their favorite meal and identify the ingredients, discussing where each ingredient comes from.

Week 2: Visiting a Local Egg Farm

Activities: Field trip to a local egg farm where students learn about the life cycle of chickens, sustainable egg production, and the importance of animal welfare.

Task: Students take notes or draw what they observed during the visit, focusing on how the farm manages its resources sustainably.

Week 3: Growing Your Own Food – Starting with Cress

Activities: Each student is given a small pot, soil, and cress seeds to plant at home. A demonstration on how to plant and care for the cress is given in class.

Task: Students plant their seeds at home and start a growth journal, documenting the progress of their plants with drawings or short notes.

Week 4: Understanding Food Chains

Activities: Discuss the concept of food chains and the journey of food from farm to fork, using the egg farm visit as an example.

Task: Students create a simple diagram showing the journey of an egg from the farm to their plate, including all the steps in between.

Week 5: Home Gardening and Sustainability

Activities: Check-in on the progress of students' cress plants. Discuss what plants need to grow and the benefits of growing your own food.

Task: Students share their observations from their growth journals and discuss any challenges they've faced in growing their cress.

Week 6: Reducing Food Waste

Activities: Discuss the problem of food waste and brainstorm ways to reduce it at home and in school.

Task: Students make posters with tips on how to reduce food waste, which will be displayed in the school cafeteria.

Week 7: Cooking with Homegrown Herbs

Activities: Students bring their harvested cress to school. They prepare a simple snack (e.g., cress sandwiches or salads) using their homegrown herbs

Task: Students write a short reflection on what it felt like to grow and eat their own food.

Week 8: Presenting What We've Learned

Activities: Students prepare a short presentation or a creative project (e.g., a poster, a mini-book, or a video) summarising what they've learned about sustainable food from farm to fork.

Task: Present their projects to the class or at a school event, sharing their experiences and encouraging others to think about where their food comes from.

Involvement of the Community:

- The local egg farm provides an opportunity for students to see sustainable agriculture in action.
- Parents and family members are involved by supporting the students' home gardening activities.
- The final presentations or creative projects can be shared with the wider school community, possibly at a school event or assembly.

Grouping:

- Students will work individually on their home gardening project, with support from family members.
- In-class activities, such as the food chain diagrams and food waste posters, will be done in small groups to encourage collaboration.

Schedule:

- Sessions will be held twice a week, each lasting 60 minutes, with additional time for the farm visit and special activities like the cooking session.

Spaces, Materials, and Resources:

- Classroom for discussions and group activities.
- Garden space or window sills at home for growing cress.
- Materials: Cress seeds, small pots, soil, markers, poster boards, and cooking ingredients.
- Transportation and permission slips for the farm visit.

Dissemination Actions and Material:

- Students' posters and growth journals can be displayed in the school to raise awareness about sustainable food practices.
- A section on the school's website or a class blog could be dedicated to documenting the project's progress and outcomes.
- Local media or the school newsletter can be used to share the story of the farm visit and students' learning experiences.

SUSTAINABILITY:

- The school garden project could be expanded by involving future classes in growing different plants or starting a small vegetable patch.
- Ongoing partnerships with local farms can provide additional learning opportunities, such as seasonal visits or guest speakers.
- Students can be encouraged to continue gardening at home, with the school providing seeds and advice each year.

EVALUATION:

Evaluation of the Service:

- Assess the effectiveness of the farm visit in enhancing students' understanding of sustainable food production.
- Evaluate the impact of home gardening on students' attitudes towards food and the environment.

Evaluation of Students' Learning:

- Continuous formative assessment through observations of participation in activities and discussions.
- Summative assessment based on the quality of growth journals, group projects, and final presentations.
- Self-assessment and reflection on what they've learned and how their views on food have changed.





Learning situation 9

(SUSTAINABLE MOBILITY)

“PROMOTING ZERO-EMISSION PRIVATE TRANSPORT”

LEVELS: High School (Grades 9-12)

TIMING: Ongoing throughout the academic year

JUSTIFICATION AND CONTEXTUALIZATION:

Throughout the academic year, students will develop an understanding of the importance of zero-emission private transport in mitigating air pollution and reducing greenhouse gas emissions. They will explore various sustainable transportation options and engage in activities to promote the adoption of zero-emission vehicles in their school and community.

The transport sector plays a significant role in contributing to Europe’s emissions, with a quarter of emissions originating from this sector alone. Recognizing the urgency to address this issue, the European Green Deal outlines ambitious goals to transition towards sustainable mobility solutions. This chapter explores the strategies and initiatives proposed to mitigate emissions and promote environmentally friendly forms of transportation.

Transitioning Goods Transportation:

In Europe, a substantial portion of goods transportation heavily relies on road networks, which not only contributes to emissions but also exacerbates congestion issues. Recognizing the urgent need for change, the European Green Deal introduces a bold objective: transitioning 75% of goods currently transported by road to more sustainable modes such as rail and water transport.

The rationale behind this ambitious goal is clear and compelling. By shifting goods transportation away from roads and towards rail and waterways, significant reductions in emissions can be achieved. Moreover, such a transition would alleviate the strain on road infrastructure, mitigating congestion and enhancing overall transportation efficiency.

To realize this vision, a multifaceted implementation strategy is essential. Firstly, substantial investments in rail and water infrastructure are imperative to accommodate increased freight traffic and ensure the reliability and efficiency of

alternative transportation modes. This includes the modernization and expansion of railway networks, as well as improvements to inland waterway systems and port facilities.

Furthermore, incentivizing businesses to embrace alternative modes of transportation is crucial. This can be achieved through a combination of regulatory measures, financial incentives, and supportive policies aimed at encouraging the adoption of rail and water transport for freight logistics. Such incentives may include subsidies for transitioning to greener transportation methods, tax breaks for companies investing in sustainable logistics solutions, and preferential treatment for environmentally friendly transport options in procurement processes.

Additionally, developing efficient logistics networks is paramount to facilitating the seamless integration of rail and water transport into existing supply chains. This involves optimizing freight routes, enhancing intermodal connectivity between different modes of transportation, and leveraging digital technologies to improve logistics management and tracking.

In conclusion, transitioning goods transportation from road to more sustainable modes such as rail and water is a cornerstone of the European Green Deal's efforts to combat emissions and build a greener, more resilient transportation infrastructure. Through strategic investments, incentives, and logistical innovations, Europe can pave the way towards a more sustainable future for freight transport while simultaneously reducing environmental impacts and enhancing economic competitiveness.

Promoting Zero-Emission Private Transport:

In the current transportation landscape, private vehicles, predominantly powered by combustion engines, stand as significant contributors to air pollution and greenhouse gas emissions across Europe. To combat this pressing issue, the European Green Deal introduces a visionary approach centered on promoting zero-emission forms of propulsion, with electric vehicles (EVs) taking center stage in the transition towards sustainable private transportation.

The core vision of the Green Deal underscores the imperative to accelerate the adoption of zero-emission vehicles, particularly EVs, as a means to mitigate air pollution and reduce carbon emissions. By shifting away from traditional combustion engine vehicles, Europe aims to revolutionize private transportation, ushering in an era of cleaner, greener mobility solutions.

To facilitate this transition, a range of supportive measures are proposed to incentivize the uptake of EVs and promote the adoption of zero-emission private transport options. Key among these measures is the expansion of charging infrastructure to enhance the accessibility and convenience of EV ownership. Investments in charging stations, both public and private, are essential to address range anxiety and encourage more individuals to embrace electric vehicles.

Furthermore, financial incentives and subsidies play a crucial role in incentivizing consumers to opt for EVs over traditional vehicles. These incentives may include tax rebates, purchase grants, and discounts on vehicle registration fees, making EVs more financially appealing and competitive in the market.

Moreover, promoting shared mobility options such as car-sharing and ride-sharing initiatives can further accelerate the transition to zero-emission private transport. By maximizing vehicle utilization and reducing the overall number of vehicles on the road, shared mobility models contribute to congestion reduction and emissions mitigation, aligning with the broader sustainability goals of the European Union.

Crucially, the Green Deal sets forth a clear trajectory towards achieving zero-emission mobility, with a defined transition timeline commencing from 2025. This timeline serves as a roadmap for policymakers, industry stakeholders, and consumers alike, providing clarity and direction in the journey towards a sustainable transportation future.

Promoting zero-emission private transport holds immense potential for not only mitigating air pollution and reducing greenhouse gas emissions but also for fostering a culture of sustainability within school communities. Encouraging students and staff to embrace zero-emission modes of transportation, such as electric vehicles (EVs) or active transportation like walking or cycling, can significantly contribute to environmental conservation efforts while also setting a positive example for future generations. Schools can play a pivotal role in promoting and facilitating the adoption of zero-emission private transport by providing charging infrastructure for EVs, organizing educational campaigns to raise awareness about the benefits of sustainable transportation options, and incentivizing the use of greener modes of travel through initiatives such as carpooling or rewards programs. By actively promoting zero-emission private transport among students and staff, schools not only contribute to reducing their carbon footprint but also instill lifelong habits of environmental responsibility and stewardship.

In conclusion, promoting zero-emission private transport is a cornerstone of the European Green Deal's efforts to combat air pollution, reduce greenhouse gas emissions, and foster a more sustainable mobility ecosystem. Through a combination of supportive measures, including infrastructure investments, financial incentives, and shared mobility initiatives, Europe can accelerate the transition towards zero-emission mobility and realize its vision of a cleaner, greener transportation landscape.

Enhancing infrastructure and accessibility is pivotal to fostering sustainable and inclusive transportation systems across urban and rural areas. To facilitate the transition to electric vehicles (EVs), a key focus is on expanding the network of recharging points, ensuring convenient access for EV owners regardless of their location. This entails strategic placement of charging stations in urban centers, residential areas, commercial districts, and along major transportation routes. Moreover, investing in fast-charging technology can minimize charging times and alleviate concerns about range anxiety, thereby encouraging more individuals to adopt EVs as their preferred mode of transport.

In addition to EV infrastructure, promoting light mobility options such as bicycles, e-scooters, and other micro-mobility solutions offers a sustainable alternative to traditional car travel, particularly for short-distance trips. By investing in cycling infrastructure such as dedicated bike lanes, bike-sharing programs, and secure bicycle parking facilities, cities can encourage active transportation and reduce congestion while promoting public health and well-being. Furthermore, integrating e-scooter sharing schemes into existing transportation networks provides commuters with flexible and environmentally friendly mobility options, complementing public transit and reducing reliance on personal vehicles for short urban journeys.

Shared mobility initiatives, including car-sharing and ride-sharing services, play a crucial role in optimizing transportation resources and enhancing accessibility for all members of society. By facilitating the sharing of vehicles among multiple users, these initiatives not only reduce the overall number of vehicles on the road but also improve mobility options for individuals who may not have access to private transportation. Moreover, promoting carpooling and ride-sharing helps alleviate traffic congestion, reduce emissions, and enhance the affordability of transportation, particularly for underserved communities and low-income households.

Enhancing infrastructure and accessibility in transportation systems encompasses a range of measures aimed at promoting sustainable, efficient, and equitable mobility solutions. By expanding EV charging infrastructure, promoting light mobility options, and fostering shared mobility initiatives, cities and communities can create more accessible, inclusive, and environmentally friendly transportation networks that meet the diverse needs of their residents while advancing towards a greener and more sustainable future.



IMPLEMENTATION AND DIDACTIC SEQUENCING:

Pre-Unit Planning:

- Collaborate with science teachers, environmental clubs, and local transportation authorities to develop a comprehensive curriculum on zero-emission private transport.
- Identify guest speakers, experts, and field trip opportunities related to sustainable transportation, electric vehicles, and renewable energy.

Unit 1: Introduction to Zero-Emission Transport

1. Understanding Greenhouse Gas Emissions:

- Introduce the concept of greenhouse gases and their role in climate change.
- Discuss the sources of transportation-related emissions and their environmental impacts.

2. Introduction to Zero-Emission Vehicles:

- Define zero-emission vehicles (ZEVs) and explore different types, including electric cars, bicycles, scooters, and public transit.
- Discuss the benefits of ZEVs in reducing air pollution, improving public health, and mitigating climate change.

3. Case Studies and Real-World Examples:

- Analyze case studies and real-world examples of communities or cities successfully promoting zero-emission transport initiatives.
- Discuss challenges, successes, and lessons learned from these initiatives.

Unit 2: Sustainable Transportation Options

1. Electric Vehicles:

- Explore the technology behind electric vehicles, including battery technology, charging infrastructure, and range considerations.
- Conduct research on different models of electric cars and compare their features, costs, and environmental benefits.

2. Active Transportation:

- Discuss alternative modes of transportation such as walking, cycling, and scootering, and their role in promoting active lifestyles and reducing carbon emissions.
- Organize a bike safety workshop or walking tour of the local community to promote active transportation options.

Unit 3: Promoting Zero-Emission Transport.

1. Awareness Campaigns:

- Design and implement an awareness campaign to educate the school and community about the benefits of zero-emission transport.
- Create posters, flyers, and social media posts highlighting the environmental and health benefits of ZEVs.

2. Community Engagement:

- Organize a community event or workshop on sustainable transportation options, featuring guest speakers, interactive exhibits, and test drives of electric vehicles.
- Collaborate with local businesses, government agencies, and transportation providers to promote incentives and discounts for zero-emission vehicles.

Unit 4: Monitoring and Evaluation (Throughout the Year)

1. Data Collection and Analysis (Ongoing):

- Collect data on transportation habits, vehicle preferences, and attitudes towards zero-emission transport among students and community members.
- Analyze survey results, transportation logs, and emission data to track changes in behavior and perceptions over time.

2. Feedback and Reflection (Quarterly):

- Solicit feedback from students, staff, and community members on the effectiveness of zero-emission transport initiatives and awareness campaigns.
- Reflect on challenges, successes, and opportunities for improvement, and adjust strategies accordingly.

Unit 5: Action Planning for the Future (End of Year)

1. Future Planning and Advocacy:

- Develop action plans and recommendations for sustaining and expanding zero-emission transport efforts beyond the school year.
- Identify opportunities for further research, policy advocacy, and community engagement to promote sustainable transportation options.

Assessment:

- Assess students' understanding and engagement throughout the year through quizzes, presentations, project-based assessments, and reflective journals.
- Evaluate the effectiveness of awareness campaigns and community events in promoting zero-emission transport options and changing attitudes towards sustainable transportation.
- Monitor changes in transportation behavior and vehicle preferences among students and community members through data collection and analysis.

Extension Activities:

- Organize field trips to electric vehicle dealerships, charging stations, or renewable energy facilities to provide hands-on learning experiences and inspire interest in sustainable transportation careers.
- Collaborate with local government agencies, environmental organizations, and transportation providers to advocate for policies and incentives that promote zero-emission vehicles and infrastructure development.
- Partner with community organizations to establish bike-sharing programs, carpooling initiatives, or electric vehicle charging stations in the school or local area, further promoting sustainable transportation options and reducing carbon emissions.

SUSTAINABILITY:

Sustaining and expanding the project over time is crucial for maximizing its long-term impact on promoting zero-emission private transport. To ensure sustainability, the school can establish partnerships with local businesses, government agencies, and community organizations to secure ongoing support and resources for sustainable transportation initiatives. This may include securing funding for electric vehicle charging infrastructure, establishing maintenance plans for bike-sharing programs, and coordinating with transportation providers to expand public transit options. Additionally, integrating sustainable transportation education into the school curriculum and promoting student-led initiatives can help institutionalize a culture of environmental stewardship and civic engagement. By fostering a sense of ownership and responsibility among students, staff, and community members, the school can sustain momentum and continue to advance towards a greener, more sustainable future.



Learning situation 10

(SUSTAINABLE MOBILITY)

“THE CHALLENGE OF THE SUSTAINABLE TRANSPORT IN THE CITY”

LEVELS: Primary

TIMING: One term of the school year. 16 sessions (approximately 2 sessions per month)

JUSTIFICATION AND CONTEXTUALIZATION:

This learning situation is carried out to raise students' awareness of the importance of finding sustainable solutions for transport in their city. Through this activity, students will be able to understand the relevance of caring for the environment and how their choice of transport can positively or negatively impact air quality and the urban environment. In addition, creative and innovative thinking is promoted by setting the task of creating a superhero who uses sustainable means of transport, thus encouraging cooperation, problem solving and appreciation of natural heritage.

This learning situation contributes not only to the development of sustainability-related skills but also to interdisciplinary problem solving and creative thinking.

Background: We live in cities where many people travel daily to access schools, workplaces, shopping and various services. Problems of traffic congestion and air and noise pollution are significant. Authorities want to find solutions to make transport more environmentally friendly. It is estimated that around 5 billion people will live in cities by 2030, so work is needed on proper planning and management of urban areas. The world population is expected to reach 9.6 billion people by 2050, which means that the equivalent of three planets will be needed to maintain the current lifestyle. By promoting responsible consumption and mobility we can ensure the survival of the planet.

The mission of this learning situation is to help local authorities find sustainable ways of transport, by bringing creative ideas from the community that make the city a more sustainable, inclusive, resilient and safe place for all people who travel every day. Achieving the Sustainable Development Goals is only possible through cooperation between governments, civil society, scientists, academia and the private sector. If we all work together, we will ensure that by 2030 no one is left behind.

This educational program aims to ensure that students not only acquire knowledge about sustainable mobility, but also become active agents of change in improving their urban environment.

Objectives:

- Raising awareness of the impact of transport on the environment: learning how the use of different transport systems contributes to air pollution and climate change and raising awareness of the importance of reducing the carbon footprint through more sustainable transport choices.
- Promote the use of sustainable means of transport such as bicycles, public transport, and walking as healthy and ecological alternatives to car use.
- Stimulate students' creativity to propose innovative and practical solutions that promote the use of sustainable transport in their community.
- Develop skills for analysis and problem solving: learn to identify mobility problems in the immediate environment.
- Involve students and the community in the design of projects and campaigns that promote sustainable mobility, analyzing the benefits and challenges of different transportation options.
- Promote community participation by motivating students to collaborate with their families, neighbors and local authorities to implement ideas that improve mobility in their community.
- Promote a sense of collective responsibility towards improving the urban environment and quality of life in the city.
- Development of responsible and environmentally friendly attitudes, values of respect and care for the environment and people, recognizing the positive impact of sustainable transport on the health and safety of the community.
- Promote behaviors that contribute to a cleaner, safer and friendlier city for all its inhabitants.

CURRICULAR CONCRETION:

Competences:

- Identify the characteristics of the different elements or systems of the natural environment, establishing relationships between them, sharing and exchanging the information obtained, to recognize the value of natural heritage, conserve it, improve it, and undertake actions for its responsible use and contribute to a culture of sustainability.
- Solve problems through interdisciplinary design projects and the application of computational thinking, to cooperatively generate a creative and innovative product that responds to specific needs.

- Creative group design of a “superhero” who uses sustainable means of transport to solve the problem of traffic and pollution in their city, experimenting with different creative ideas and using safe materials to represent the superhero.
- Recognize the main characteristics and basic properties of sustainable means of transport, exploring their operation through observation and analysis of how they contribute to reducing pollution in the urban environment.
- Show respect for natural heritage by valuing the importance of using sustainable means of transport to preserve the environment as a common good, thus recognising its contribution to a cleaner and safer urban environment.

Includes the following general competences:

- Citizenship competence: which helps students to exercise responsible citizenship and participate fully in social and civic life. It includes critical reflection on the major ethical problems of our time and the development of a sustainable lifestyle in line with the Sustainable Development Goals set out in the 2030 Agenda.
- Mathematical competence and competence in science, technology, engineering and arts (STEAM): which involve understanding the world using scientific methods, mathematical thinking and representation, technology, arts and engineering methods to transform the environment in a committed, responsible and sustainable way.
- Personal, social and learning-to-learn competence: which involves the ability to promote constant personal growth; collaborate with others constructively; maintain resilience; ability to cope with uncertainty and complexity; adapt to change; be able to lead a future-oriented life; as well as express empathy and address conflicts in an integrative and supportive context.
- Entrepreneurial competence: which involves developing a life approach aimed at acting on opportunities and ideas, using the specific knowledge necessary to generate valuable results for other people. It provides strategies that allow you to adapt your perspective to detect needs and opportunities; train your thinking to analyze and evaluate the environment, and create and rethink ideas using imagination, creativity, strategic thinking and ethical, critical and constructive reflection; and awaken the willingness to learn, take risks and face uncertainty.

Evaluation Criteria :

- Guided and team-based production of a simple final product that solves a design problem, experimenting with different prototypes and safely using appropriate materials.
- Knowledge of the main characteristics, organization and basic properties of the environment and the elements of the natural environment through exploration and using appropriate tools and processes.
- Curiosity and initiative in carrying out different investigations and activities.
- Show respectful attitudes towards the environment and natural heritage, recognizing it as a common good.

- Basic teamwork strategies
- Active participation in project activities.
- Quality of educational materials developed.
- Effectiveness of community engagement activities.
- Degree of reflection and commitment to climate action.
- Degree of collaboration between school and out-of-school participants.
- Impact of the service on the local environment and community.

Basic Knowledge :

- Impact of transport on the environment: how the use of different modes of transport contributes to air pollution and climate change.
- Carbon footprint of travel.
- Sustainable means of transport (bicycles, public transport and walking) as healthy and ecological alternatives to car use.
- Innovative and practical solutions that promote the use of sustainable transport.
- Problems associated with mobility in the immediate environment.
- Sustainable lifestyles and the importance of caring for the planet through scientific knowledge present in everyday life.
- The Sustainable Development Goals. Especially SDG 11 (Sustainable cities and communities), SDG 12 (Sustainable consumption and production patterns) and SDG 13 (Climate action)
- Inquiry procedures appropriate to the needs of the research (observation over time, identification and classification, search for patterns, etc.)
- Importance of contact with nature. Care, respect and empathy towards living beings and the environment in which they live.
- Ecosocial responsibility . Importance of individual actions.
- Actions for the conservation, improvement and sustainable use of common goods.

METHODOLOGY:

The Service Learning Method will serve as the main focus, complemented by other experiential learning techniques.

The learning situation will be carried out in a playful and participatory manner, encouraging creativity, imagination, and teamwork. Methodological strategies such as meetings, interviews and other practical activities, presentations, storytelling, artistic expression, and research-experimentation will be used. Students will be organized into small groups to encourage collaboration and the exchange of ideas.

Attention will be paid to diversity by adapting activities to meet individual pupils' needs. For example, the choice of different forms of expression (drawing,

storytelling, dramatisation) will be allowed so that each pupil can participate according to his or her abilities and interests.

IMPLEMENTATION:

Didactic sequencing:

Sessions 1-2: Introduction. What do we know?

Sessions 3-10: It's time to explore new ideas!

Sessions 11-13: Let's get creative!

Sessions 14-15: Let's get ready for action!

Session 16: It's time to shine as the planet's superheroes!

Activities:

Introduction. What do we know?

Welcome to an exciting adventure in which we will be superheroes of the planet! Did you know that in our city we face a huge problem with pollution and traffic? Your mission will be to help find sustainable ways of transportation to make our city a cleaner and safer place for everyone. Let's think of creative ideas to make the city environmentally friendly. Imagine yourself as superheroes fighting pollution in the city. How would you do it? It's time to activate your imagination and creativity to save the planet!

1. Imagine what a superhero fighting pollution in the city would look like. Draw or colour a superhero with a sustainable means of transport.
2. Individually think of three different ideas for sustainable means of transport that could help reduce pollution in the city. Draw them and briefly describe them.

It's time to explore new ideas!

We will find out what the needs are for improving travel in the city and how to make it more sustainable. We will learn about different forms of transport and how they affect the environment. We can see how cycling, public transport or walking can contribute to reducing pollution.

We will work with government, local authorities and entities to gather information and identify potential improvements to urban mobility and areas for community engagement.

We will also learn about the importance of taking care of the planet by using these sustainable means of transport. How about we explore how each of them can turn us into superheroes of the planet?

- 1-2. In groups, research the topic of cycling, public transport and walking. Find the advantages of each means of transport in relation to reducing pollution in the city.
- 3-4. Each group will focus on one of the sustainable means of transport and prepare a short oral presentation explaining why it is a good option to combat

pollution in the city.

- 5-6.** Fieldwork and interviews: Conduct interviews in the family and social environment to find out what the biggest problems are associated with traffic in the neighborhood or city and find out how infrastructure and public transport services can be improved to make it more sustainable.
- 7-8.** Hold meetings with traffic officers, police, local citizens' associations, environmental organisations, etc. to present our findings, exchange information and gather their perspectives on the main problems of traffic jams and pollution in the city and the solutions.

Let's get creative!

Imagine you are a superhero fighting pollution in the city. Think of a costume, a choreography, a song or a story that shows how you use a sustainable means of transport to save the planet. What would you like to do to inspire people to use non-polluting means of transport? It's time to awaken the superhero within you.

- 1.** Create a superhero costume that represents the use of a sustainable means of transport. You can use recycled or reused materials.
- 2-3.** Prepare a short choreography or story that shows how you use sustainable means of transport to save the planet.

Let's get ready for action!

Let's plan our performance to put all our ideas in order and show others how we can save the planet through the use of sustainable means of transport.

We will carefully plan every detail, from the costume to the choreography or song.

We will also put our creative skills to work to make our performance inspiring. Get ready to become a true superhero of the planet!

Exercises:

- 1.** Let's plan our performance. Think about how you will dress up to become a superhero of the planet.
- 2.** What song or story are you going to create to inspire people to use sustainable means of transport?

It's time to shine as the planet's superheroes!

We will carry out our performances using a sustainable means of transport. We will show everyone how we can take care of the environment and make our city cleaner and safer. In addition, we will share our creative ideas with others to inspire more people to use planet-friendly means of transport. We will be true superheroes of the planet!

- 1.** Carry out your performance using a sustainable means of transport. Demonstrate how to take care of the environment and make the city cleaner. Share your creative ideas with your classmates and the rest of the educational community to inspire them.

Grouping:

- Students will work in small groups to research, prepare presentations, interviews and carry out creative work.
- Community members will be involved in all phases of the program, including planning, implementation and evaluation.

Schedule:

- The sessions will take place over 10 weeks (not consecutively) with several sessions in some weeks until 16 sessions are completed.

Rooms , Materials , and Resources :

Rooms, materials and resources:

- Materials for the performance and the complete programme: books, images or videos related to sustainable transport, paper and craft materials for creating costumes or sets,
- Classes and physical space for group work, meetings and collaborative work with the community and organizations.
- Physical space for performances.

Dissemination Actions and Material:

- Social media campaigns and local media coverage to raise awareness.
- Information about the performance will be disseminated in city halls, local community centres and various organisations.

SUSTAINABILITY:

- Collaboration between schools, local entities and organizations will be maintained to continue with other educational projects beyond the duration of the program.
- Integration of sustainable mobility topics into the curriculum to maintain awareness and engagement of prospective students.
- Establishment of new community-led initiatives.

EVALUATION:

A continuous formative assessment will be carried out, observing participation, creativity, understanding of the subject and group collaboration.

In addition, a rubric will be used to evaluate the final performance, considering originality, the message conveyed and the presentation.

Both the learning process and the final result of each group's performance will be assessed.



Learning situation 11

(POLLUTION CONTROL)

“LEARN, ACT, TRANSFORM! ACTIONS TO REDUCE SOLID WASTE POLLUTION AND IMPROVE THE ENVIRONMENT OF THE MUNICIPALITY”

LEVELS: Primary, 5th-6th grades (11- 12 years old) - Secondary 1st-4th grades (13-16 years old).

TIMING: The whole school year (September to June). 18 sessions (approximately 2 sessions per month)

JUSTIFICATION AND CONTEXTUALISATION:

The municipality faces significant challenges in terms of waste management: the need to reduce the production of solid waste, to improve citizen contribution in waste separation for proper waste management and recycling, urban cleanliness and the elimination of some bad waste disposal practices in natural areas.

Furthermore, the issue of solid waste management and its relationship with climate change due to the excessive use of packaging and the necessary changes that must be implemented throughout the life cycle of the products we buy, are aspects that give rise to the development of an educational program to comprehensively address some of the challenges of the 21st century that have to do with the environmental and climate crisis and the transition to a circular and carbon neutral economy.

It is therefore considered interesting to set up this learning situation promoted from the school, involving the local community with the aim of mutual enrichment and obtaining practical and lasting educational results and a greater commitment to climate action, both in the pupils and the local population, as well as contributing to directly improving our environment, immediately and in the short and medium terms.

The stakeholders of the municipality that will be involved in the programme in different ways will be: educational community (families, teachers), citizens and representatives of associations, educational authorities, local authorities and municipal representatives, environmental technicians, members of environmental associations, local scientific community and experts, local workers related to cleaning and urban waste management, among others.

The expected **benefits** of the programme in the municipality are as follows:

- Reduction of solid waste pollution in the municipality.
- Increased environmental awareness and commitment to environmental and climate action in the community.
- Development of skills for environmental problem solving and citizen participation.
- Detection and elimination of improper waste dumping sites in the municipality.
- Cleaning of riverbanks and other environmentally sensitive areas in the municipality with school and citizen collaboration.

Objectives:

- To raise students' awareness of the importance of preserving the environment and mitigating climate change.
- To understand the implications of our consumption habits in terms of greenhouse gas emissions and the need to reduce the purchase of packaged products.
- To identify and address specific waste pollution problems in the neighbourhood or municipality.
- Encourage active community participation in reducing pollution in general, and waste pollution in particular.

CURRICULAR CONCRECTION:

Competences:

- Awareness and sensitivity towards the environment and climate change challenges.
- Capacity for reflective and critical analysis of the consequences that our daily actions have on the environment, contributing to an individual or collective awareness.
- Development of sustainable and responsible forms of consumption that encourage the reuse, repair and recycling of waste.
- Knowledge and understanding of correct ways of separation and individual management of solid waste, and how they contribute to the reduction of greenhouse gases and therefore to improving the climate emergency situation.
- Awareness of the need for individual contribution to the climate challenge.
- Teamwork and collaboration skills to address environmental problems.
- Ability to identify problems and propose solutions related to pollution and climate change.

Evaluation Criteria:

- Active participation in project activities.
- Understanding of concepts related to waste management, pollution and climate change.
- Degree of reflection and commitment to climate action.
- Degree of collaboration between school and out-of-school participants.
- Creativity in the development of educational materials.
- Impact of the service on the local environment and community.

Basic knowledge:

- Life cycle of the products we consume.
- Impact of air pollution on climate change.
- Impact of the production, consumption and disposal of packaging and other solid waste in general on climate change.
- Impact of waste pollution on the environment.
- Strategies for proper waste management and the circular economy: Reformulate, Reflect, Reduce, Reuse, Repair, Recycle, Revalue, Redesign, Reward.
- Strategies to reduce greenhouse gas emissions and promote environmental sustainability.

METHODOLOGY:

- Service Learning Method: Students will engage in practical activities to address waste pollution and climate change issues in the municipality, working in partnership with the local community at different stages of the programme with the aim of sharing learning and experiences and resulting in concrete and real community services and benefits.
- Other educational techniques: Project-based learning, guided visits to recycling facilities, talks with environmental and climate experts, debates and research on the impact of inadequate solid waste management, artistic and creative activities to communicate solutions and raise public awareness.

IMPLEMENTATION AND DIDACTIC SEQUENCING:

Sessions 1-2: Introduction to the project and awareness raising on waste pollution and climate change. Invitation to citizens and local representatives to participate.

Sessions 3-6: Educational, informative and reflective activities on the environmental and climate implications of the manufacture, transport, use and subsequent management of solid waste, with special emphasis on the importance of minimising waste production through the implementation of a circular economy and individual responsibility when buying, reusing, recycling, etc.

Sessions 7-9: Research in the local environment to identify the most suitable community stakeholders to involve and actions needed to improve waste management at municipal and citizen levels as well as the most important waste accumulation hotspots in the municipality.

Sessions 10-14: Design and implementation of actions to address these problems, such as recycling campaigns, cleaning of sensitive areas, communication campaigns on correct waste separation at home, and other measures deemed necessary in the community.

Sessions 15-17: Design and elaboration of informative materials and other communication actions.

Session 18: Evaluation of the results and reflection on the impact of the project on the community and on the mitigation of climate change.

Community involvement during the programme:

- Involvement from the beginning in the activities of presentation and awareness-raising on the issues.
- Active participation in the identification of problems and design of solutions.
- Collaboration in the implementation of practical actions to reduce pollution and greenhouse gas emissions: elimination of improper waste dumping points and cleaning of riverbanks and other sensitive areas in the municipality with the collaboration of schools.
- Support in disseminating the project and raising awareness about climate change.

Grouping of participants:

- Organisation in small mixed groups, encouraging diversity of skills, concerns and knowledge related to pollution and climate change.

Organisation of time:

- Sessions of approximately 2 hours (approximately fortnightly), integrated into the regular school timetable.
- Flexibility to carry out certain activities outside school hours in coordination with the community.

Spaces, materials and resources needed:

- School spaces for meetings and planning.
- Classrooms for educational activities.
- Outdoor spaces for practical activities.
- Recycling material, cleaning and adequate protection (gloves, masks, bags, etc.).
- Transport for some trips and visits
- Stationery and creative materials for the design of information and dissemination materials.
- Internet access for research and communication of the campaign.

Dissemination actions and material:

- Development of informative posters and leaflets to raise community awareness of the relationship between waste management, pollution and climate change, and actions to mitigate them.
- Use of social networks and local media to disseminate the project and its results.
- Press conferences and press releases sent out.

SUSTAINABILITY:

- Building partnerships with local institutions, enterprises and environmental and climate organisations to sustain the project in the long term and promote continued climate action.
- Integration of the programme into the school curriculum to ensure its continuity for future grades and generations of students committed to environmental sustainability and climate change mitigation.

EVALUATION:

- Pre- and post-project evaluations to measure changes in knowledge and attitudes, as well as ongoing assessment of pupils' progress against the programme objectives and their understanding of the impact of waste on the environment and climate change.
- Evaluation of student participation, collaboration and creativity in the development of educational materials.
- Evaluation of the impact of the service on the community through surveys and direct observation.
- Community feedback on the efficacy of the educational campaign and the effectiveness of the implemented actions and their contribution to local and global climate action.



Learning situation 12

(POLLUTION CONTROL)

“AIR QUALITY IMPROVEMENT”

LEVELS: High School (Grades 9-12)

TIMINGS: Ongoing throughout the academic year

JUSTIFICATION AND CONTEXTUALIZATION:

Throughout the academic year, students will develop a comprehensive understanding of air quality issues, explore the factors contributing to air pollution, and engage in activities aimed at improving air quality in their school and community.

Pollution poses significant threats to public health, ecosystems, and the environment. The European Green Deal incorporates a comprehensive Zero Pollution Action Plan, aiming to eliminate all sources of air, water, and soil pollution by 2050. This chapter delves into the strategies outlined in the Action Plan to combat pollution and mitigate its adverse effects.

Air Quality Improvement:

Air pollution poses multifaceted challenges, stemming primarily from emissions generated by various sectors including industries, transportation, and agricultural activities. These emissions not only degrade air quality but also contribute significantly to global warming and climate change, amplifying the urgency for action. The Zero Pollution Action Plan, a cornerstone of the European Green Deal, outlines comprehensive strategies to combat air pollution.

One of the pivotal objectives of the Action Plan is to set ambitious targets aimed at reducing air pollution levels across Europe. These targets are underpinned by a combination of regulatory measures and incentives designed to drive the transition towards cleaner technologies and practices. Central to this approach is the imperative to enhance air quality standards while simultaneously fostering innovation in pollution control technologies.

To achieve these targets, a multifaceted approach is adopted. Firstly, there's a concerted effort to transition towards cleaner energy sources such as renewable energy and low-carbon technologies. By reducing reliance on fossil fuels in power generation, significant reductions in emissions of harmful pollutants such as sulfur dioxide (SO₂), nitrogen oxides (NO_x), and particulate matter (PM) can be achieved.

Moreover, stringent regulations are proposed to improve emission standards for vehicles and industrial facilities. This entails implementing measures such as the introduction of Euro standards for vehicle emissions and the adoption of best available techniques (BAT) in industrial processes to minimize pollutant releases. Additionally, incentives and subsidies may be provided to encourage industries and vehicle manufacturers to invest in cleaner technologies and comply with stricter emission standards.

Furthermore, agricultural emissions, particularly from livestock farming and fertilizer use, represent a significant source of air pollution. To address this, measures are proposed to promote sustainable agricultural practices, reduce methane emissions from livestock, and optimize fertilizer application to minimize ammonia emissions. By integrating environmental considerations into agricultural policies, the Action Plan seeks to mitigate the environmental footprint of agricultural activities while ensuring food security and sustainability.

In summary, the Zero Pollution Action Plan presents a comprehensive framework for tackling air pollution through a combination of regulatory interventions, technological innovation, and sustainable practices across key sectors. By implementing these measures, Europe aims to safeguard public health, protect the environment, and advance towards a cleaner, more sustainable future.

IMPLEMENTATION AND DIDACTIC SEQUENCING

Materials Needed:

- Whiteboard or chalkboard
- Projector or computer for multimedia presentations
- Handouts with relevant articles, case studies, and data on air quality
- Art supplies, gardening tools, and materials for hands-on activities
- Access to online resources and environmental monitoring tools (optional)

Procedure:

Pre-Unit Planning:

- Collaborate with science teachers, environmental clubs, and local environmental organizations to develop a comprehensive curriculum on air quality improvement.
- Identify guest speakers, experts, and field trip opportunities related to air quality monitoring, environmental science, and sustainable practices.

Unit 1: Understanding Air Quality

1. Introduction to Air Quality:

- Present an overview of air quality issues, including common pollutants, sources of air pollution, and their effects on human health and the environment.
- Introduce key concepts such as air quality indices, particulate matter, ozone depletion, and greenhouse gases.

2. Factors Contributing to Air Pollution:

- Explore the primary sources of air pollution, including transportation, industrial activities, agriculture, and household emissions.
- Conduct research on local air quality data and identify specific pollutants of concern in the community.

3. Impact of Air Pollution:

- Discuss the health, environmental, and socioeconomic impacts of air pollution on communities locally and globally.
- Analyze case studies and real-world examples of air pollution incidents and their consequences.

Unit 2: Solutions for Air Quality Improvement

1. Regulatory Measures and Policy Advocacy:

- Investigate existing environmental regulations and policies aimed at reducing air pollution at the local, national, and international levels.
- Explore strategies for advocacy and civic engagement to influence policy decisions and promote air quality improvement initiatives.

2. Technological Innovations and Clean Energy:

- Research and analyze innovative technologies and clean energy solutions for reducing emissions and improving air quality, such as electric vehicles, renewable energy, and green infrastructure.
- Invite guest speakers from clean energy companies, research institutions, or environmental organizations to discuss advancements in air pollution control technologies.

3. Community Engagement and Action:

- Plan and implement community-based projects focused on improving air quality, such as tree planting initiatives, neighborhood clean-up campaigns, or advocacy events.
- Collaborate with local stakeholders, government agencies, and community organizations to raise awareness and mobilize collective action.

Unit 3: Monitoring and Evaluation

1. Environmental Monitoring:

- Set up air quality monitoring stations in the school or community to collect data on pollutant levels, weather conditions, and air quality trends.
- Teach students how to use monitoring equipment and interpret data to assess air quality and identify areas for improvement.

2. Data Analysis and Reporting:

- Analyze and interpret air quality data collected over the course of the year.
- Create reports and presentations summarizing key findings, trends, and recommendations for air quality improvement measures.

Unit 4: Reflection and Action Planning (End of Year)

1. Reflection and Evaluation:

- Reflect on the year-long learning journey and evaluate the effectiveness of various activities and initiatives in raising awareness and promoting air quality improvement.
- Discuss challenges, successes, and lessons learned, and identify opportunities for future action and collaboration.

2. Action Planning for the Future:

- Develop action plans and recommendations for sustaining and expanding air quality improvement efforts beyond the classroom.
- Identify areas for further research, advocacy, and community engagement, and outline strategies for continued involvement in environmental conservation initiatives.

Assessment:

- Assess students' understanding and engagement throughout the year through a combination of quizzes, presentations, project-based assessments, and reflective journals.
- Evaluate the effectiveness of community-based projects and initiatives in promoting air quality improvement and fostering civic engagement.
- Monitor student participation, collaboration, and leadership in planning and implementing environmental activities and advocacy campaigns.

Extension Activities:

- Partner with local environmental organizations, government agencies, and businesses to expand student-led initiatives and community engagement efforts.

- Organize a culminating event or air quality expo to showcase students' projects, share findings with the community, and celebrate achievements in air quality improvement.
- Encourage students to pursue further research or internships in environmental science, public health, or policy advocacy to deepen their understanding and involvement in air quality improvement initiatives.

SUSTAINABILITY:

Sustaining and expanding efforts for air quality improvement throughout the academic year requires ongoing engagement and commitment from students, educators, and the broader community. To ensure long-term sustainability, the school can integrate air quality education into the curriculum across multiple subjects, reinforcing key concepts and fostering a culture of environmental awareness. Regular monitoring of air quality metrics can provide valuable data to track progress and identify areas for improvement, empowering students to take informed action.

Furthermore, establishing partnerships with local environmental organizations, government agencies, and businesses can provide access to resources, expertise, and funding opportunities to support ongoing initiatives. By promoting student leadership and involvement in air quality projects, the school can cultivate a sense of ownership and responsibility, empowering students to become advocates for clean air in their school and community. Through collaborative efforts and continued dedication, the school can sustain momentum and make lasting strides towards achieving healthier, more sustainable air quality for all.





Learning situation 13

(POLLUTION CONTROL)

“WATER POLLUTION PREVENTION”

LEVELS: Middle School (Grades 6-8)

TIMINGS: Two 45-minute class periods

JUSTIFICATION AND CONTEXTUALIZATION:

Students will understand the sources and impacts of water pollution, identify preventive measures, and propose solutions to mitigate water pollution in their community.

WATER POLLUTION PREVENTION

Water pollution is a complex issue stemming from various sources such as industrial discharge, agricultural runoff, and improper waste disposal, posing significant threats to aquatic ecosystems and the quality of water resources essential for human consumption. The Zero Pollution Action Plan, as part of the broader European Green Deal, addresses these concerns with a focused strategy aimed at safeguarding water resources.

The primary objective of the Action Plan is to implement measures that prevent water pollution, enhance water treatment infrastructure, and promote sustainable water management practices. This multifaceted approach recognizes the interconnectedness of environmental, social, and economic factors influencing water quality and availability.

To achieve these objectives, a robust regulatory framework is proposed, emphasizing the need to strengthen regulations pertaining to wastewater treatment, agricultural practices, and chemical management. This entails setting stringent standards for industrial effluent discharge, promoting the adoption of advanced treatment technologies to minimize pollutants entering water bodies, and enforcing measures to prevent contamination from hazardous chemicals and pollutants.

Furthermore, enhancing water treatment infrastructure is vital to ensure the effective removal of pollutants and the provision of safe and clean water for consumption and ecosystem support. Investments in wastewater treatment plants, decentralized treatment systems, and natural filtration methods are essential components of this strategy.

In addition to regulatory and infrastructural measures, promoting sustainable water management practices is crucial for long-term water resource protection. This includes measures such as water conservation initiatives, watershed management approaches, and integrated water resource management frameworks that consider the needs of various stakeholders while preserving ecological integrity.

Addressing water pollution also necessitates a holistic approach that recognizes the interconnectedness of water, soil, and ecosystems. Therefore, efforts to protect and remediate soil contamination play a critical role in preventing further degradation of water bodies. Strategies may include remediation of contaminated sites, promoting soil conservation practices, and implementing land-use planning measures to minimize soil erosion and sedimentation in waterways.

In conclusion, the Zero Pollution Action Plan underscores the importance of concerted efforts to prevent water pollution, enhance water treatment infrastructure, and promote sustainable water management practices. By implementing these measures and strengthening regulatory frameworks, Europe aims to safeguard its water resources, protect aquatic ecosystems, and ensure access to clean and safe water for present and future generations.

IMPLEMENTATION AND DIDACTIC SEQUENCING

Procedure:

Session 1: Understanding Water Pollution

1. Introduction:

- Begin the lesson by asking students what they know about water pollution. Write down their responses on the board.
- Explain that water pollution occurs when contaminants are introduced into bodies of water, leading to adverse effects on aquatic ecosystems and human health.

2. Discussion:

- Present case studies or examples of water pollution incidents from around the world. Discuss the sources of pollution, its impact on aquatic life and communities, and potential preventive measures.
- Encourage students to ask questions and engage in discussions about the causes and effects of water pollution.

3. Activity: Sources of Water Pollution:

- Divide students into small groups and provide each group with a list of common sources of water pollution (e.g., industrial discharge, agricultural runoff, sewage discharge).
- Ask each group to choose one source of water pollution and create a poster or visual representation illustrating how it contaminates water bodies and its impact on the environment.

Session 2: Preventing Water Pollution

1. Review:

- Recap the previous lesson by briefly discussing the sources and impacts of water pollution identified by each group.

2. Presentation (15 minutes):

- Have each group present their posters or visual representations to the class. Encourage students to explain their chosen source of pollution, its effects, and potential preventive measures.

3. Discussion:

- Facilitate a class discussion on preventive measures to reduce water pollution. Encourage students to brainstorm solutions at both individual and community levels.
- Emphasize the importance of personal responsibility in preventing water pollution and the role of government regulations and environmental policies.

4. Activity: Designing a Water Pollution Prevention Plan:

- Divide students into small groups and assign each group a specific water pollution challenge (e.g., reducing plastic pollution in rivers, preventing agricultural runoff).
- Task the groups with brainstorming and designing a comprehensive plan to address the assigned challenge. Encourage them to consider preventive measures, community engagement strategies, and potential obstacles.
- Provide guidance and support as needed, and encourage creativity and innovation in their solutions.

5. Wrap-Up:

- Reconvene as a class and have each group share their water pollution prevention plan. Encourage constructive feedback and discussion on the feasibility and effectiveness of their proposals.
- Conclude the lesson by emphasizing the importance of collective action in protecting water resources and the role that students can play in advocating for clean water in their communities.

Assessment:

- Assess students' understanding of water pollution and preventive measures through their participation in class discussions, group activities, and the quality of their presentations and proposed prevention plans.
- Evaluate students' critical thinking skills and ability to apply knowledge to real-world scenarios.

Extension Activities:

- Organize a field trip to a local water treatment facility or environmental organization focused on water conservation and pollution prevention.
- Encourage students to conduct research projects on specific water pollution issues affecting their community and propose solutions to address them.
- Collaborate with local environmental agencies or community groups to implement student-led initiatives aimed at reducing water pollution and raising awareness in the community.

SUSTAINABILITY:

Maintaining and expanding efforts for water pollution prevention throughout the academic year requires ongoing dedication and collaboration from students, educators, and the wider community. To ensure long-term sustainability, the school can integrate water pollution prevention education into various subjects, reinforcing key concepts and promoting a culture of environmental stewardship. Regular monitoring of water quality parameters in local water bodies can provide valuable data to assess the effectiveness of prevention measures and identify areas for improvement. Additionally, establishing partnerships with local environmental organizations, government agencies, and stakeholders can offer access to resources, expertise, and funding opportunities to support ongoing initiatives.

Encouraging student involvement in water conservation and pollution prevention projects, such as watershed clean-up events and habitat restoration efforts, fosters a sense of ownership and empowers students to become advocates for clean water in their community. By fostering a sense of collective responsibility and promoting active engagement, the school can sustain momentum and work towards preserving water resources for future generations.





Learning situation 14

(POLLUTION CONTROL) “SOIL PROTECTION AND REMEDIATION”

LEVELS: Middle School (Grades 6-8)

TIMINGS: Ongoing throughout the academic year.

JUSTIFICATION AND CONTEXTUALIZATION:

Throughout the academic year, students will develop a comprehensive understanding of soil degradation, explore the causes and consequences of soil pollution, and engage in activities aimed at protecting and restoring soil health in their school and community.

SOIL PROTECTION AND REMEDIATION

Soil degradation poses a significant threat to agricultural productivity, ecosystem health, and biodiversity, stemming from various sources such as industrial activities, improper waste disposal, and chemical contamination. Recognizing the urgent need to address soil pollution, the Zero Pollution Action Plan advocates for a multifaceted approach to prevent further degradation and restore soil health.

One of the key strategies outlined in the Action Plan is the implementation of stricter waste management practices to minimize the release of pollutants into the soil. This includes enforcing regulations on hazardous waste disposal, promoting recycling and waste reduction initiatives, and implementing measures to prevent illegal dumping and contamination of soil and groundwater.

Moreover, remediation of contaminated sites is essential to mitigate the adverse effects of soil pollution on human health and the environment. This involves identifying and prioritizing contaminated sites for remediation, conducting site assessments to determine the extent of contamination, and implementing appropriate remediation techniques such as soil excavation, containment, and bioremediation.

Promoting sustainable land use practices is also integral to preventing soil degradation and promoting soil health. This includes measures such as promoting organic farming practices, reducing the use of chemical fertilizers and pesticides, implementing soil conservation techniques such as crop rotation and cover cropping, and promoting agroecological approaches that enhance soil fertility and biodiversity while minimizing environmental impacts.

Furthermore, restoration efforts are essential to rehabilitate degraded soils and restore their health and functionality. This may involve initiatives such as reforestation and afforestation to improve soil structure and prevent erosion, implementing soil remediation techniques such as phytoremediation and soil amendment, and promoting land restoration projects that enhance ecosystem services and biodiversity.

Addressing soil degradation requires a comprehensive approach that integrates prevention, remediation, and restoration efforts. By implementing measures to prevent soil pollution, promoting sustainable land use practices, and investing in soil restoration initiatives, Europe can safeguard soil health, preserve biodiversity, and ensure the long-term sustainability of agricultural and natural ecosystems.

Schools serve as vital hubs for nurturing environmental consciousness and actively contributing to air quality improvement. Through a holistic approach encompassing both practical measures and educational initiatives, schools can effectively mitigate air pollution and foster a culture of environmental stewardship. Here's how schools can enhance their efforts in this regard:

- 1. Implementing Comprehensive Green Initiatives:** Schools can spearhead sustainable practices by reducing energy consumption through the adoption of energy-efficient technologies, implementing waste reduction and recycling programs to minimize landfill contributions, and integrating eco-friendly practices into their daily operations. This includes sourcing eco-friendly supplies, minimizing single-use plastics, and optimizing resource utilization.
- 2. Promoting Sustainable Transportation Practices:** By advocating for and facilitating alternative transportation methods such as walking, cycling, or carpooling, schools can significantly reduce vehicular emissions in their vicinity. Establishing safe walking and cycling routes, organizing bike-to-school initiatives, and incentivizing carpooling among students and staff can effectively diminish the carbon footprint associated with daily commutes.
- 3. Embedding Environmental Education in the Curriculum:** Integrating comprehensive environmental education into the curriculum empowers students with the knowledge and skills needed to comprehend environmental challenges and engage in meaningful solutions. From science classes exploring air quality monitoring to social studies lessons on sustainable development goals, incorporating environmental themes across various subjects fosters a deeper understanding of air quality issues and inspires proactive environmental stewardship.
- 4. Creating Green Spaces for Enhanced Air Quality:** Transforming school grounds into vibrant green spaces, such as community gardens, tree-lined avenues, or biodiverse habitats, not only enhances aesthetics but also serves as natural air purifiers. Trees and plants act as carbon sinks, absorbing pollutants and releasing oxygen, thereby improving air quality and promoting biodiversity. Engaging students in the creation and maintenance of green spaces fosters a sense of ownership and environmental responsibility.

5. Fostering Collaborative Partnerships: Schools can leverage partnerships with local authorities, environmental organizations, and businesses to amplify their impact on air quality improvement. Collaborative initiatives may include advocating for clean air policies, organizing community clean-up drives, or participating in tree planting campaigns. By actively engaging with the broader community, schools can mobilize collective action towards achieving cleaner, healthier air for all.

Through the concerted implementation of these initiatives and the cultivation of a culture rooted in environmental responsibility, schools can serve as catalysts for positive change, not only in their immediate surroundings but also in fostering a sustainable future for generations to come.

IMPLEMENTATION AND DIDACTIC SEQUENCING

Procedure:

Pre-Unit Planning:

- Collaborate with science teachers, environmental clubs, and local conservation organizations to develop a comprehensive curriculum on soil protection and remediation.
- Identify guest speakers, experts, and field trip opportunities related to soil conservation, organic farming, and land restoration.

Unit 1: Understanding Soil Pollution

1. Introduction to Soil Health:

- Present an overview of soil composition, structure, and functions in supporting plant growth and ecosystem services.
- Introduce key concepts such as soil degradation, erosion, contamination, and their implications for agricultural productivity and environmental sustainability.

2. Causes and Consequences of Soil Pollution:

- Explore the primary sources of soil pollution, including industrial activities, improper waste disposal, chemical use in agriculture, and urban development.
- Discuss the environmental, agricultural, and human health impacts of soil pollution, including loss of biodiversity, water contamination, and food safety concerns.

3. Case Studies and Real-World Examples:

- Analyze case studies and real-world examples of soil pollution incidents and their consequences on local communities and ecosystems.
- Discuss historical and ongoing efforts to remediate contaminated sites and restore soil health in different regions.

Unit 2: Strategies for Soil Protection

1. Soil Conservation Techniques:

- Explore strategies for preventing soil degradation and erosion, such as conservation tillage, cover cropping, contour farming, and terracing.
- Conduct hands-on activities to demonstrate erosion control methods and assess their effectiveness in preserving soil structure and fertility.

2. Promoting Sustainable Agriculture:

- Investigate sustainable agricultural practices that promote soil health and biodiversity, such as organic farming, agroforestry, crop rotation, and integrated pest management.
- Visit local farms or community gardens to observe sustainable farming techniques and engage in hands-on activities related to soil conservation and organic gardening.

Unit 3: Soil Remediation and Restoration

1. Remediation Techniques:

- Explore various techniques for soil remediation, including bioremediation, phytoremediation, soil vapor extraction, and soil washing.
- Conduct experiments or simulations to demonstrate the effectiveness of different remediation methods in removing contaminants from soil and restoring soil health.

2. Restoration Projects:

- Plan and implement soil restoration projects within the school or community, such as reforestation, wetland restoration, or urban greening initiatives.
- Collaborate with local conservation organizations, government agencies, or community groups to identify suitable project sites and mobilize resources for implementation.

Unit 4: Monitoring and Evaluation (Throughout the Year)

1. Soil Testing and Analysis

- Set up soil testing stations in the school or community to assess soil quality, pH levels, nutrient content, and contamination levels.
- Teach students how to collect soil samples, conduct tests, and interpret results to identify areas for improvement and track changes in soil health over time.

2. Data Interpretation and Reporting

- Analyze soil testing data collected throughout the year and create reports summarizing key findings, trends, and recommendations for soil protection and remediation measures.
- Present findings to the school community, local stakeholders, and relevant authorities to raise awareness and advocate for soil conservation initiatives.

Unit 5: Reflection and Action Planning (End of Year)

1. Reflection and Evaluation:

- Reflect on the year-long learning journey and evaluate the effectiveness of various activities and initiatives in promoting soil protection and remediation.
- Discuss challenges, successes, and lessons learned, and identify opportunities for future action and collaboration.

2. Action Planning for the Future:

- Develop action plans and recommendations for sustaining and expanding soil protection and remediation efforts beyond the classroom.
- Identify areas for further research, community engagement, and advocacy, and outline strategies for continued involvement in soil conservation initiatives.

Assessment:

- Assess students' understanding and engagement throughout the year through a combination of quizzes, presentations, project-based assessments, and reflective journals.
- Evaluate the effectiveness of hands-on activities and field experiences in reinforcing key concepts and promoting experiential learning.
- Monitor student participation, collaboration, and leadership in planning and implementing soil protection and remediation projects within the school and community.

Extension Activities:

- Partner with local conservation organizations, government agencies, and environmental research institutions to expand student-led initiatives and community engagement efforts.
- Organize a community-wide soil health fair or conservation expo to showcase students' projects, share findings with the public, and foster collaboration among stakeholders.
- Encourage students to pursue further study or careers in environmental science, conservation biology, or sustainable agriculture to deepen their understanding and involvement in soil protection and remediation efforts.

SUSTAINABILITY:

To ensure the sustainability of the soil protection and remediation efforts, it's essential to foster a culture of environmental stewardship within the school and wider community. Encourage students to take ownership of ongoing soil conservation initiatives by regularly monitoring soil health, implementing sustainable gardening practices, and advocating for policies that support soil protection. Integrate soil protection and remediation into the school curriculum to ensure that future generations are equipped with the knowledge and skills needed to safeguard soil resources. Establish partnerships with local environmental organizations, government agencies, and community groups to collaborate on long-term soil conservation projects and share resources and expertise. By cultivating a sense of responsibility and collective action, we can work together to preserve soil health and biodiversity for generations to come.





Learning situation 15

(PROTECTING BIODIVERSITY AND FORESTS)

"BUZZING FOR CHANGE: REINFORCING BEE CONSERVATION IN LEÓN PROVINCE"

LEVELS: Primary and Secondary

TIMING: The whole school year (September to June). 17 sessions (approximately 2 sessions per month)

JUSTIFICATION AND CONTEXTUALIZATION:

The province of León, as well as other parts of Europe and the world, faces challenges related to declining bee populations, which have significant implications for local ecosystems and agriculture.

Honey bees have a very important position in the cycle of natural life. According to the Food and Agriculture Organization (FAO), bees pollinate 71 out of 100 crops, which account for 90% of the world's food. Without pollinators, up to 20,000 plant species in Europe would probably become extinct in a short time. This would reduce biodiversity and disrupt the ecosystem and the food chain. That is why it is important that we prevent the mass death of bees that has taken place around the world in recent years. Bees need to be seen as a bio-indicators of the state of the environment.

The availability and quality of bee grazing on a global scale has changed dramatically, especially over the last half century due to the advent of intensive agriculture.

Examples of changes in agriculture include the advent of artificial fertilizers, the massive use of herbicides, the application of nitrogen fertilizers, which support the growth of grasses at the expense of flowering plants, pastures etc.

The objectives of this learning situation are to raise awareness about the importance of bees for biodiversity conservation, address specific problems facing bee populations in the local community, and promote sustainable practices among students and community members, by implementing specific measures that support solutions to this problem. By engaging in this project, students will develop a deeper understanding of beekeeping practices, the importance of the pollinators for biodiversity conservation and agriculture and other environmental

issues; they will also acquire skills in collaboration, communication, and community engagement. Local communities, especially beekeepers, farmers, trade union officers and public representatives, among others, will obtain also a deeper understanding of this important environmental problem and solutions, finding some help for implementing small solutions.

The expected **benefits** include increased awareness of bee conservation, the development of practical solutions to local challenges, and the establishment of lasting partnerships between schools, communities, and local stakeholders.

In the province of León, bees face several challenges and diseases that affect their health and survival, such as:

- **Pesticides and pollutants:** Excessive use of pesticides in agriculture can contaminate nectar and pollen, affecting bee health and causing colony mortality. Contamination of water and air by chemicals can have negative effects on the health of bees and other pollinators.
- **Habitat loss and monoculture crops:** Loss of natural habitat and intensive agriculture reduces the availability of food resources and shelter for bees. Agricultural monocultures, where a single plant species is grown over large areas, provide a limited diet and may expose bees to increased amounts of pesticides.
- **Climate change:** Climate change can alter the flowering patterns of plants, affecting the availability of food for bees. Extreme temperatures, droughts and severe weather events can stress bee colonies and affect their ability to survive and reproduce.
- **Parasites and diseases:** Several diseases are seriously affecting bees such as the *Varroa destructor*, parasite (a mite that weakens bees and encourages them to be affected by viruses that can be lethal), disease caused by *Nosema* microorganisms, and other bacterial diseases that can cause larval death and weaken colonies.

Addressing these challenges requires a holistic approach that includes sustainable agricultural practices, appropriate pesticide use, protection and restoration of natural habitats, scientific research and education on the importance of conserving bees and other pollinators.

Objectives:

- Understand the importance of bees in ecosystems and agriculture.
- Recognize the significance of local context in conservation efforts.
- Develop skills in collaboration, communication, and community engagement.
- Reflect on personal and collective responsibility towards environmental conservation.

CURRICULAR CONCRETION:

Competences:

- Understand the role of bees in ecosystems and agriculture and the importance of biodiversity protection.
- Knowledge of the challenges that are affecting bee populations, among others overusing plant protecting products and intensive agriculture.
- Knowledge of how climate change is affecting bees
- Ability to collaborate with local communities and stakeholders to protect honey bees and wild pollinators.
- Teamwork skills to address environmental problems.
- Ability to identify problems and propose solutions related to the protection of biodiversity and climate change.
- Skills in designing and implementing educational campaigns.

Evaluation Criteria:

- Understanding of bee conservation issues.
- Active participation in project activities.
- Quality of educational materials developed.
- Effectiveness of community engagement activities.
- Degree of reflection and commitment to climate action.
- Degree of collaboration between school and out-of-school participants.
- Impact of the service on the local environment and community.

Basic Knowledge:

- Understanding bee biology and behavior.
- Understanding the role of bees in ecosystems and agriculture and the importance of biodiversity protection.
- Identifying threats to bee populations.
- Knowledge of the challenges that are affecting bee populations, among others overusing plant protecting products and intensive agriculture.
- Knowledge of how climate change is affecting bees
- Sustainable beekeeping and agriculture practices.

Content Outline:

1. Introduction to Bee conservation:

- Understanding the importance of bees in ecosystems.
- Exploring the decline of bee populations and its implications.
- Introducing the concept of sustainable beekeeping practices.

2. Local context:

- Learning about the specific ecosystem and agriculture of León Province.
- Understanding the role of bees in local agriculture and biodiversity.
- Identifying current challenges facing bee populations in the region.

3. Engagement with local communities:

- Collaborating with local beekeepers, farmers, and environmental organizations.
- Conducting interviews and field visits to understand local perspectives and practices.
- Identifying potential areas for community involvement in bee conservation efforts.

4. Educational Campaign development:

- Working with secondary school students to design educational materials about bee conservation.
- Creating engaging content such as posters, videos, and presentations.
- Planning outreach activities to raise awareness within the community.

5. Implementation and reflection:

- Implementing the educational campaign in local schools, community centers, and public spaces.
- Reflecting on the impact of the project on both students and the community.
- Assessing the effectiveness of the campaign in promoting bee conservation and raising awareness.

METHODOLOGY:

The Service-Learning Method will serve as the primary approach, supplemented by experiential learning techniques such as field visits, interviews, and project-based learning activities.

IMPLEMENTATION AND DIDACTIC SEQUENCING:

Sessions 1- 3: Introduction to bee conservation and local context.

Sessions 4-9: Engagement with local communities and stakeholders. Working together.

Sessions 10-15: Development of educational materials and outreach activities.

Sessions 16-17: Reflection and evaluation.

Activities:

Approach to the topic. Research and community assessment:

1. Students conduct research on the current state of bee populations in León Province and identify specific challenges faced by local beekeepers and farmers.
2. Speech on the experience of beekeepers in relation to the loss of bees with subsequent discussion to share information and different perspectives, involving not only beekeepers but also schools and local communities
3. Debate sessions on Bee conservation:
 - Invite authorities from agricultural departments, environmental experts, pesticide applicators, farmers, politicians, beekeepers, and other relevant stakeholders to participate in a debate session.
 - Topics for discussion may include the impact of pesticide use on bee populations, the role of agricultural policies in supporting bee-friendly practices, and strategies for mitigating threats to bee health.
 - Facilitate the debate to encourage constructive dialogue, exchange of perspectives, and identification of common goals for bee conservation efforts.

Engagement with local communities and stakeholders

4. Collaborate with local entities, beekeepers, farmers, and environmental organizations to gather insights and identify potential areas for community involvement.
5. Field Visits and Interviews:
 - Organize field visits to local apiaries, farms, and natural habitats to observe bee behavior and understand the importance of diverse ecosystems for bee survival.
 - Conduct interviews with beekeepers, farmers, and community members to gather perspectives on bee conservation and potential barriers to implementation.
- 6- 8. Workshops on sustainable beekeeping practices and creating herbicide-free zones:
 - Invite local beekeepers and farmers to conduct workshops on sustainable beekeeping and agriculture practices, emphasizing the importance of organic farming and minimizing pesticide use.
 - Engage students and community members in hands-on activities such as building bee-friendly habitats and installing bee hotels in public spaces.
 - Collaborate with local authorities and landowners to identify areas where herbicide use can be minimized or eliminated, such as public parks, school gardens, and roadside verges.
 - Organize community workdays to plant bee-friendly vegetation, and establish maintenance plans for the herbicide-free zones.

9. Building new beehives:

- Partner with local beekeeping associations or suppliers to obtain materials for constructing new beehives.
- Organize a practical session where students, under the guidance of experienced beekeepers, participate in assembling new beehives.
- Teach students about the different components of a beehive, proper hive placement, and hive management techniques.

Development of outreach and awareness campaign

10-12. Educational material development:

- Work with students to develop educational materials (posters, brochures, videos) based on the outcomes of the debate session, highlighting key points of agreement and areas for further action.
- Conduct peer review sessions to ensure accuracy and effectiveness of the educational materials.

13-15. Outreach and awareness campaign:

- Organize outreach events in local schools, community centers, and farmers' markets to disseminate the educational materials developed during the project.
- Engage the public in discussions about bee conservation and encourage community members to take action in support of bee-friendly practices.

Reflection and evaluation

16. Monitoring and Evaluation:

- Establish monitoring protocols to track changes in bee populations and biodiversity within the herbicide-free zones.
- Collect feedback from community members and stakeholders on the impact of the debate session and subsequent outreach efforts on public awareness and attitudes towards bee conservation.

17. Reflection and Future Planning:

- Facilitate reflection sessions with students and community members to discuss the outcomes of the project, including the debate session and outreach activities.
- Collaboratively develop a plan for sustaining and expanding bee conservation efforts in the community, incorporating insights gained from the debate and ongoing monitoring efforts.- Involvement of the Community:

Grouping:

- Students will work in small groups to research, design, and implement educational materials and activities.
- Community members will be involved in all stages of the program, including planning, implementation, and evaluation.

Schedule:

- Sessions will be conducted over a span of 8 weeks, with one session per week.

Rooms, Materials, and Resources:

- Classroom space for group work, discussions and collaboration with local beekeepers, farmers, and environmental organizations.
- Access to beekeeping equipment and resources.
- Budget for materials and supplies for the educational campaign.
- Transportation for field visits and community engagement activities.
- Budget for materials and supplies for the educational campaign.

Dissemination Actions and Material:

- Educational materials will be distributed in local schools, community centers, and public spaces.
- Social media campaigns and local media coverage to raise awareness.

SUSTAINABILITY:

- Partnerships with local stakeholders will be maintained to ensure ongoing support for bee conservation efforts.
- Integration of bee conservation topics into the curriculum to sustain awareness and engagement among future students.
- Establishment of community-led initiatives to continue bee conservation projects beyond the duration of the program.

EVALUATION:

- Evaluation of Students' Learning:
 - Pre- and post-project assessments to measure changes in knowledge and attitudes towards bee conservation.
 - Assessment of student participation, collaboration, and creativity.
 - Feedback from community members on the impact of student-led activities.
- Evaluation of Service:
 - Impact on local communities and stakeholders.
 - Effectiveness of the educational campaign in raising awareness.
 - Effectiveness of the measures implemented (bee hotels, beehives)



Learning situation 16

(PROTECTING BIODIVERSITY AND FORESTS)

“TAKING CARE OF OUR WOOD; HAEDA ´S ELVES”

LEVELS: Primary, 5th-6th grades (11 and 12 years old) - Secondary 1st-4th grades (13-16 years old).

TIMINGS: The whole school year (September to June). 18 sessions (approximately 2 sessions per month).

JUSTIFICATION AND CONTEXTUALIZATION:

We are a small school in the North Mountain of León. Very near our village there is a wood which has thousands of visits at weekends, especially in spring and autumn. The wood is small and it has not the capacity to renew that spoiled by the excess of visitors. From our school we try to mend some of this damage, but it needs to be done more systematically. We want to create an association; Haeda ´s elves (being the elves the pupils of our school). The wood has a legend called Haeda ´s coal. (Haeda is a witch according with a legend).

The Faedo (wood) is very damaged by the excess of visitors. We intend, with the association we will create, that the authorities limit access to the forest, even if it is only in spring and autumn, the times of the year when there is more influx.

Our forest is a natural wealth that has supported many families and businesses in the town since the mines closed. Our population has lived looking away while we could live on coal, but it is not so any longer, that is why we have to be aware and work to protect it. Our children must see it as the treasure it is and become its “elves”.

We hope that from this experience our students will be able to extrapolate care for what surrounds us to care for nature in general. Make them see that their environment is important and of vital importance to their life. Guide them to look further and learn that our actions have a direct impact on nature. We must learn to take care of our closest environment and then worry about what we may never be able to see, but that will definitely influence our lives and the lives of the animals and vegetation on our planet.

CURRICULAR CONCRETION	
Outputs & deliverables	Delivery date
Maintenance of our wood	Octobre
Getting the involvement and concern of students and their families about how their town is doing	All through the existence of our association
Arousing the curiosity of students and their families about the typical vegetation of our area (Alto Bernesga Biosphere Reserve). Getting to know the name of the most common species and what some of them are useful for.	Novembre
Awaking the awareness that we are responsible for maintaining our nearest environment, and by extension environment in general.	All through the existence of our association
Organizing cultural productions that now take place in the school and will from now on take place in the forest, so that our population feel it as something important for us.	All through the existence of our association.



IMPLEMENTATION AND DIDACTIC SEQUENCING

Task 1: May

- Create the Haeda´s elves.

Task 2: June

- Make and install signage and information about the forest throughout the town.
- Make and install signage for the visitors to advise them how to behave (walk on the wood path, do not disturb the animals, do not pick up anything from the wood).

Task 3: October

- We will clean the wood. It es really needed after a summer and perfect to star an autumn.

Task 4: November

- We will plant new trees where needed.

Task 5: All through the year

- Our pupils will organize and carry out a cultural show that will take place in the wood.

