

EDUCATIONAL CURRICULUM



Neutral Schools

Innovation and school action
for a Carbon neutral future
(R1)



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



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EDUCATIONAL CURRICULUM “NEUTRAL SCHOOLS”



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EDUCATIONAL CURRICULUM “NEUTRAL SCHOOLS”

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EDUCATIONAL CURRICULUM



Neutral Schools

I. PRESENTATION

INTRODUCTION

The aim of the project “*NEUTRAL SCHOOLS, Innovation and school action for a Carbon neutral future*”, and consequently of its results, is to transcend the traditional role of schools as mere academic centers to become platforms influencing future values, attitudes, and behaviors. The results and actions of the project aim to contribute to a profound transformation of Schools, where European schools are perceived as:

- Exemplars of sustainability and environmental management
- Role Models: integrate sustainable practices into daily operations and curricula with the aim of becoming role models for society, inspiring positive change.
- Dominos of Positive Change: catalyze a domino effect of positive change extending beyond the confines of schools, resonating in communities and nations.

NEUTRAL SCHOOLS aim to contribute the ambitious goal of carbon neutrality established by the European politics, to be achieved through substantial reductions in greenhouse gas emissions in key areas such as energy consumption, transportation, and waste management, among others.

The final goal of our project is to support the teaching professions in the profound transformation of schools by providing them with innovative materials, methods and tools for the teaching-learning process linked to the global challenge of mitigation, adaptation and fight against climate change and achieve a climate neutral future.

The different results and activities of the project, including this Curriculum, will help teachers to:

- Complement their training on the main issues related to the fight against climate change and the sustainable development goals (SDGs).
- Develop school programs that address complex environmental issues under the iSTEAM integrated educational approach, thanks to the adaptation of the curricular design for primary and compulsory secondary education, which overcomes the restrictions imposed by the usual compartmentalized educational curriculum.
- Integrate the Service-Learning Methodology (SLM), eminently collaborative, from the basis of direct and practical action in the environmental and cultural environment of the students.

The aim is therefore to support teachers in their work as agents of change, transmitters to their students of the capacities and skills that primary and secondary students must incorporate in the face of the global climate challenge and the necessary ecological and energy transition, issues to be addressed. which education is not alien to.

The iSTEAM teaching will expand the integrative approach by providing “science knowledge”, so closely linked to the problem of climate change, promoting the necessary creativity, critical thinking, communication skills and collaboration.

All of this in order to promote citizens with greater knowledge and environmental awareness, analyzing the climate challenge from all areas of knowledge in both the primary and secondary school curriculum.

Through the SLM and from the iSTEAM perspective, the integration of areas such as music, physical education, social, civic and ethical values, plastic education, etc. will be facilitated, in addition to those scientific areas that have been common in the teaching-learning processes of these topics, to further encourage sustainability through education. Supporting teachers so that they have greater instruments to promote interest in science, technology, engineering and mathematics through artistic expressions is essential to encourage sustainability through education (Sustainable Development Goal 4.7).

Consequently, the project seeks to promote the motivation of “action for change” in schools: promoting innovative forms of participation that reach the entire educational community; as part of the social responsibility of educational institutions and centers, in the challenge for schools themselves to assume the necessary changes to achieve a carbon-neutral future and extend their action to their most immediate environment.



Our overarching mission extends beyond mere information dissemination; it is an educational crusade aimed at nurturing a deep-rooted understanding of the imperative role that every individual plays in the journey toward sustainability.

Our mission seeks to orchestrate a multi-faceted approach to this educational endeavor. Firstly, we aspire to enact substantial reductions in energy consumption, achieved through a series of strategic interventions, including energy-efficient technologies and behavioral changes.

We recognize that creating a sustainable future is not the responsibility of students alone; it is a collective endeavor that necessitates the active engagement of the entire community. We aim to cultivate a profound sense of environmental stewardship among students, their families, and the wider community, fostering a shared commitment to sustainable living.

In tandem with these practical measures, we are dedicated to embedding sustainability into the educational system. To this goal, we champion the integration of sustainability topics into the curriculum.

In sum, our mission encompasses not only the reduction of energy consumption and carbon emissions but also the holistic transformation of our educational ecosystem into a bastion of sustainability. Through increased awareness, engagement, and the seamless integration of sustainability into our curriculum, we endeavor to equip our students and community with the knowledge, skills, and values necessary to become stewards of a more sustainable and resilient future.

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■ WHAT IS THE NEUTRAL SCHOOLS CURRICULUM?

The school Curriculum on the challenge of climate change and the innovation and action necessary for a Carbon neutral future is one of the pillars and fundamental results of the NEUTRAL SCHOOLS educational innovation project, contributing above all to some of its objectives such as:

- **Create knowledge and transmit scientific understanding of the climate crisis:** Knowledge of the climate crisis is based on science and research, with solid data that must be rigorously analyzed to understand both the causes and the magnitude of the consequences as well as search and prioritize possible solutions.
- **Raise awareness and empower students to drive social change and influence behaviors to face the climate challenge:** Today's students are the consumers and citizens of today and the future. They are important agents of social change, with their own change in attitude and their potential to influence the knowledge, attitudes and behaviors of their peers, family and general community.
- **Promote innovative and proactive teaching-learning in the face of the climate crisis.**

- **Support the search for solutions:** Through innovative skills based on science, service-learning methodology and the transnational exchange of good practices for the ecological and energy transition.
- **Promote critical thinking and preparation for action:** equip students with skills for active citizenship: the most prepared young people take an active role in citizen action.
- Make known the **new opportunities** that have arisen around the climate crisis.

The result developed below aims to be a curriculum model for educational processes on climate action for a Carbon neutral future, a guiding base that will not refer only to the contents but will try to guide the rest of the educational and methodological aspects.

There are different definitions and ways of understanding a Curriculum such as: "Organized structure of contents", "Set of objectives that express behaviors that the student must achieve after the educational intervention", "Instruction plan: set of knowledge developed by technicians and applied by teachers", "Set of teaching-learning experiences"...

This Curriculum attempts to respond to the most global approach: Curriculum as an instrument that guides teaching practice but whose definitive application is carried out taking into account each situation. We can affirm that in some way it would encompass all the previous partial conceptions of the Curriculum, but only as a **first level of concretion of the educational programming*** and therefore it will correspond to the essential structure and general planning of the educational programs, including:

1. The **objectives** to be achieved
2. The sequence of **competences and content units** (conceptual, attitudinal and procedural)
3. **Educational strategies** (activities and methodological techniques) to be used to facilitate the appropriate approach to the contents and facilitate the educational process
4. Some main **evaluation standards**

** All specific details will be developed by teachers and educators to adapt the curriculum to the center's programming, the specific course, the specific group of students, etc.*

■ WHAT CHARACTERISTICS DOES THIS CURRICULUM HAVE?

The Neutral Schools educational Curriculum attempts to respond to the following fundamental principles that it has been considered that a Curriculum should have:

- **Relevant and inclusive in content** : it seeks to include common training for all schoolchildren in the European Union, promoting the most relevant and up-to-date knowledge, competencies and skills, given the speed at which the climatic and environmental reality evolves as well as technology.
- **Based on the development of** students' skills, the contents being vehicles for their acquisition.
- **Guidance:** It contains the basic guidelines necessary to guide educational practice but without limiting teachers in the development of their innovation and creativity.
- **Flexible and dynamic:** It tries to facilitate changes to the needs and means of each pedagogical situation and allow the inclusion of the peculiarities of each educational community. It is necessary that teachers, students, families and entire community participate in the development and implementation of the curriculum. In this way we ensure that the curriculum is contextualized in the area where the educational center is located and we convert the educational center into a learning community, an organization that learns.
- **Transversal:** It seeks to overcome the restrictions imposed by the compartmentalization of traditional educational curricula into subjects and extend the transversality with which environmental issues are usually worked on by redefining the school Curriculum and applying the integrated iSTEAM vision (involving not only the scientific and technical subjects but also arts, language, audiovisual communication...)
- **Innovative:** The perspective of contributing to developing innovative education around the problems associated with climate change is one of the main motivations of this Curriculum.
- **Practical:** It tries to facilitate the understanding of the social, economic and ecological interrelationships of climate change from a more practical perspective than usual, hence the choice of the Service-Learning methodology as an important pillar of the educational strategies developed
- **Inspirational:** It aims to facilitate the student's understanding of the reality in which they live, motivate them to action and inspire ethical attitudes and behavior.

EDUCATIONAL STAGE TO WHICH IT IS ADRESSED

COMPULSORY EDUCATION: PRIMARY and SECONDARY

The Curriculum proposal is presented from a European perspective, so that it is easy to incorporate into the educational systems of the different European countries that want to incorporate it.

Although there are differential nuances regarding the organizational structure of the educational levels of the different countries that make up the European Union, we can say that, according to the international classification of educational levels (**International Standard Classification of Education - ISCED**), the levels at the ones that the school Curriculum of the NEUTRAL SCHOOLS project is adapted to **are levels 1 and 2, that is, Primary Education or the first stage of basic education and lower secondary education or second stage of basic education** (*Lower secondary education*).

The challenges of the climate crisis are global and require the development of critical thinking among schoolchildren and young people who will have to face both the effects of the negative impacts of climate change, as well as the changes that adaptation and mitigation measures against they will have to be adopted.

This must be achieved fundamentally in the stage of compulsory Basic Education that spans from 6 to 16 years. The Curriculum developed by this project is therefore aimed at **Basic Education**, which includes the Primary and Compulsory Secondary stages.



Photo source: Pixabay

ISCED Levels relevant to NH project *	School system level-Description	Austria school system	Spain school system	Cyprus school system	Greece school system	Portugal school system
ISCED 0	Pre-primary education	Education in kindergartens.	Kindergarten (3 to 6 years old) not mandatory			Kindergarten (3 to 6 years) (Optional)
ISCED 1 *	PRIMARY EDUCATION or 1st STAGE OF BASIC EDUCATION	Primary/ Elementary School 1st – 4th ^{grade} : 6-8-9-10 ^{years}	Primary School: 1st – 6th^{grade} : 6 -12^{years} 1 st level (1 st – 3 th grade): 6-9 years. 2 nd level (4 th – 6 th grade) 9-12 years	Primary school: 1st – 6th^{grade} : 6 -12^{years}	Primary Schools: 1st – 6th^{grade} : 6 -12^{years}	Basic education: 1st – 9th^{grade} : 6 -15^{years} 1 st level: 1 st – 4 th : 6-10 ^{years} 2 nd level: 5 th – 6 th : 10-12 years
ISCED 2 ISCED 2A ISCED 2B ISCED 2C *	LOWER SECONDARY EDUCATION or 2nd STAGE OF BASIC EDUCATION	General Secondary School 1st – 5th ^{grade} : 10-15 ^{years} . <i>Compulsory full-time until 15 years/ Compulsory part-time until 18 years</i>	Secondary Schools : 1st – 4th^{grade} : 12-16^{years}	Junior High School: 1st – 3rd^{grade} : 12-15^{years}	Junior High School: 1st – 3rd^{grade} : 12-15^{years}	3 rd level: 7 th – 9 th : 12-15 years
ISCED 3 ISCED 3A ISCED 3B ISCED 3C	Upper secondary education		Secondary Centers : Baccalaureate (a two-year level: 16-18 years or VET	Secondary education (3 grades): 15-18 years General secondary education (Upper secondary schools) or VET	Senior High School: 1st – 3rd ^{grade} : 15-18 ^{years}	Secondary education: 10 th to 12 th grade : 15-18 years <i>Compulsory full-time education until 18 years</i>

FOUNDATION OF THE PROPOSED CURRICULUM

EDUCATIONAL INNOVATION FOR THE FIGHT AGAINST CLIMATE CHANGE

The perspective of contributing to developing innovative education around the problems associated with climate change is one of the main motivations for the development of this NEUTRAL SCHOOLS Curriculum.

The climate challenge is already here, the deadlines to obtain results from European policies to combat climate change and Carbon neutrality confirm this (2030 or 2050, depending on objectives), so all efforts are necessary to contribute from the educational sector with programs that have an impact at the European level, and establish a common line of curricular work from different countries.

The challenges of the climate crisis are global and require the development of critical thinking among schoolchildren and young people who, like everyone, will have to face both the effects of the negative impacts of climate change and the changes that adaptation measures and mitigation against them will have to be adopted.



This Curriculum is developed from the conviction that school education can/should contribute to:

- Fight against the misinformation that exists about the problems associated with climate change, helping to provide scientifically verified information and training students in the search for and discrimination of information sources.
- Understand the social, economic and ecological interrelationships of climate change from a more practical perspective than usual, hence the choice of the Service-Learning methodology as the basis for its development.

- An education that involves students in activities directly linked to the reality of their environment, means: experiencing how the theory of books faces the reality of everyday life and, on the other hand, developing attitudes and skills of empathy and resolution of conflicts and capacities for reaction and response to unforeseen events that real experiences always provide.
- Extend the transversality with which environmental issues are usually worked on to projects that involve not only the science curriculum, but also the language, graphic arts, audiovisual communication curricula.

■ INTEGRATED i-STEAM APPROACH

NEUTRAL SCHOOLS proposes the re-definition of a school curriculum, applying the integrated i-STEAM approach for primary and secondary levels, also trying to enhance the updating of not only knowledge, given the speed at which reality evolves in terms of environmental and technological advances, but also in terms of training to propose, coordinate and develop strategies for ACTION FOR A CARBON NEUTRAL FUTURE in the educational center itself and from the school.

NEUTRAL SCHOOLS arises as an idea after learning the conclusions of an International Educational Research Seminar held in Granada – Spain (2019) in which the difficulties of implementing STEAM procedures were revealed, as an educational trend that is still new and therefore also still immature, at a theoretical-practical level.

The difficulties in implementing the STEAM movement exist in both primary and secondary school and among them are:

- The poor training and coordination of teachers in the application of this approach
- The lack of resources and materials in the centers
- The restrictions imposed by the compartmentalization of traditional educational curricula.

Despite these difficulties, the STEAM approach **provides good results in terms of the development of critical and computational thinking, through the resolution of environmental problems about everyday life events, integrating all areas of knowledge and skills**, including creative ones.

It also provides **other educational advantages**:

1. Transform the class into a team in which everyone is essential.

A STEAM-based group project, if implemented well, can teach a class a lesson far more important than any facts and figures: that no one can be equally good at everything, that it is okay to have talents and weaknesses, and that if people with different inclinations work as a team, everyone can contribute something useful for the common good.

2. Show that all areas are connected.

In STEAM education, no subject is inferior or superior to another and all knowledge is connected. With just a STEM focus, students might be inclined to think that science and art are separate and that you have to choose one or the other. In the real world, you are not expected to apply concepts and skills from just one field at a time: with STEAM's interdisciplinary approach, students are taught to make their own connections between subjects.

3. Help to “think outside the box”.

If all knowledge is connected, the solution can sometimes come from an unexpected place: treating subjects as parts of a whole, rather than separate units, encourages creativity and critical thinking and activates unique solutions to problems,

4. Generate applications to the real world

All the knowledge will be useful for the present and future of the students. Using STEAM principles to work on tangible projects that students can be proud of at the end demonstrates more than anything the real-world usefulness of what they are learning and gives them the opportunity to confront realistic simulations of problems that help them understand with clarity the usefulness of what is studied.

5. Promotes interest in science

Engaging in a STEAM-based education can foster a lifelong interest in science. Younger children have not yet been influenced by prejudices that make these subjects less accessible to some groups such as (women, ethnic minorities and economically disadvantaged people). A well-implemented STEAM program makes the STEM approach less intimidating.



■ USEFUL TEACHING TO THE COMMUNITY

The true success of education consists of forming good citizens capable of building a better world, of improving society and environment. Children and young people are not only the citizens of the future, they are already citizens capable of causing changes in their environment.

In the proposed Curriculum, an attempt has been made to integrate the service-learning method (SLM), an innovative method that aims to unite learning with community service and environmental and social commitment. It is based on learning by doing something useful, that is, a service to the community.

Furthermore, doing a service to the community, helping others, is one of the most effective learning methods, because boys and girls find meaning in what they study when they apply their knowledge and skills in a supportive practice.

SLM is an innovative methodology that promotes the opening of the center towards its environment, allowing links to be established between educational centers and local entities, the management bodies of natural spaces and the social groups in their environment: such as local action groups, aid to social inclusion, intercultural and intergenerational cooperation, etc.

Furthermore, the SLM methodology aims to lay the foundations for transnational cooperation projects between European schools, as agents of change towards a climate-neutral future.

■ COLLABORATION AND TRANSNATIONALITY

NEUTRAL SCHOOLS is based on the conviction that the challenges are complex and interconnected, therefore, the search for solutions and their implementation must also be faced at a global, international level and within our reach, at least at the European level.

Transnational synergy will facilitate links between educational communities and their socioeconomic environments, especially in those depressed areas that can reinvent themselves through ecological transition policies, with educational centers being engines of change in a carbon-neutral future, discovering and sharing, importing and exporting sustainability experiences.

■ COMPETENCES-BASED CURRICULUM

This curriculum aims to train citizens, educate to be, to live in the world. In this way, the competences-based curriculum helps address fundamental challenges such as:

- Manage information, in relation to its over-abundance but also in terms of critical capacity, induction or synthesis.
- Face enormous global challenges, which have to do not only with climate change but also with inequality, justice, peace, etc. and where initiative, proactivity, entrepreneurship, personal autonomy to address these challenges and to be aware of and act on them, is essential.

- Promote empathy, social competence, multiculturalism, disparity of ideas and criteria and tolerance.
- Learning to disagree, to negotiate, to live together is of vital importance in a world in permanent conflict and increasingly polarized also plays a fundamental role.

The European Union has reviewed the concept of competence, defining it as the combination of knowledge, skills and attitudes, in which:

- Knowledge is made up of facts, concepts, figures, ideas and theories that are already established and support the understanding of a specific area or topic.
- Skills are the abilities to carry out processes and use existing knowledge to obtain results.
- Attitudes describe the values and willingness to act or react to ideas, people, or situations.

These are developed with a perspective of lifelong learning and through formal, non-formal and informal learning in all contexts (school, family, environment, communities).



■ GENERAL STRUCTURE OF THE CURRICULUM

Through the Curriculum we try to address what is undoubtedly one of the great challenges, if not the greatest, that humanity must face during this century: climate change and the need to stop it. The evident difficulties in achieving a global and effective response derive from the multi-causality of the problem and the importance played by aspects related to the dominant mode of production and lifestyle and consumption.

It is vital to educate to face, from an eco-social and global approach, the challenge that the climate and energy crisis represents for current societies and to raise awareness about the repercussions it will have for future generations and about the capacity for response and action that we have, individually and collectively as citizens.

The thematic structure of the Curriculum is aligned with European policies, strategies and action plans, around the European Green Deal.

As the European Green Deal recognizes, the drivers of climate change and its solutions are global in scope and are not limited by national borders, either in their causes or their effects.

It is proposed to organize the contents into several blocks and modules with the following structure:

■ BLOCK A) THE ENVIRONMENTAL AND CLIMATE CRISIS:

MODULE 1. INTRODUCTION. ENVIRONMENT & SUSTAINABLE DEVELOPMENT

MODULE 2. CLIMATE CHANGE: ORIGIN, CONSEQUENCES AND SOLUTIONS

■ BLOCK B) ECOLOGICAL AND ENERGY TRANSITION:

MODULE 3. TOWARDS THE ECOLOGICAL-ENERGY TRANSITIONS AND CLIMATE NEUTRALITY

MODULE 4. RENEWABLE ENERGIES AND CLEAN ENERGIES

MODULE 5. ENERGY EFFICIENCY

MODULE 6. ENERGY EFFICIENT CITIES, TRANSPORT AND BUILDINGS

MODULE 7. THE CARBON FOOTPRINT

MODULE 8. CIRCULAR ECONOMY

MODULE 9. BIOECONOMY AND GREEN ECONOMY

■ BLOCK C) PERSONAL CONTRIBUTION AS CITIZENS AND CONSUMERS:

MODULE 10. SUSTAINABLE, FAIR AND RESPONSIBLE CONSUMPTION AND LIFESTYLES

MODULE 11. RESPONSIBLE LEISURE AND SUSTAINABLE TOURISM

MODULE 12. BALANCED AND SUSTAINABLE FOOD

MODULE 13. INDIVIDUAL ECOLOGICAL AND CARBON FOOTPRINTS

MODULE 14. CARBON NEUTRAL SCHOOLS. CONTRIBUTION OF THE EDUCATIONAL COMMUNITY.

CURRICULAR OBJECTIVES AND ELEMENTS

For this curricular design and development, the **general objectives and competences of the Primary and Secondary stages have been taken into account**, trying to contribute to their achievement through the contents and curricular development on climate change, ecological and energy transition and neutrality. in Carbon.

It is about applying the contents related to these topics in an integrated way to **generate increasingly more structured ideas that allow an interpretation of reality in an increasingly complex way as the stages of Primary and Secondary progress, as well as the different levels within them.**

A general joint approach of contents and competencies for Primary and Secondary is made that we consider is easily applicable to both stages, so that at a second level of programming it is the teachers-educators themselves who select and adapt the Curriculum not only to the concrete stage but also at a certain cycle or level within each of them.

To facilitate this task, a differentiated proposal of educational strategies or techniques is made for Primary and Secondary, through which the objectives and competencies pursued would be achieved, although logically at a different level of depth or complexity.

COMPETENCES

Although the specific competencies pursued in each of the modules are detailed, this curriculum also aims to contribute to the following **key competencies**, in accordance with the new European reference framework:

- Competence in linguistic communication
- Mathematical competence and competence in science, technology and engineering
- Digital competence
- Personal and social competence
- Learning to learn competence
- Citizen competence
- Entrepreneurial competence
- Competence in cultural awareness and expression
- Multilingual competence

Among the key competencies pursued with the curriculum are skills such as critical thinking, problem and conflict resolution, teamwork, communication and negotiation skills, analytical skills, the ability to investigate, relate, explore and compare, capacity for analysis and synthesis, capacity for resilience and adaptation to new situations, creativity, ethical commitment and intercultural capabilities, among others.

The established key competencies are the adaptation to national educational systems of the key competencies established in the Recommendation of the Council of the European Union, responding to the need to adapt to the challenges of the 21st century and its link with the principles and purposes of the educational system and with the school context, since the Recommendation refers to lifelong learning that must occur throughout life.

■ CONTENTS

The relevant contents are oriented towards a sustainable way of life, the fight against climate change and the transition towards a Carbon neutral future, through information and awareness about the climate and environmental crisis, the key aspects for the ecological transition and necessary energy and Carbon neutrality (clean and renewable energies, energy efficiency, mobility, energy-efficient construction and spatial organization, calculation and reduction of the Carbon footprint and promotion of the circular economy and the green economy); in addition to the knowledge, skills and awareness of concrete actions to contribute individually and collectively as consumers and citizens or from schools. Furthermore, it is intended that they have to train for the development of a sustainable way of life with a lower Carbon footprint in the natural, urban and digital environment.

The curricular contents are detailed for each of the curriculum modules, organized into three basic types of content:

1. **CONCEPTUAL CONTENTS (KNOW, UNDERSTAND:** knowledge)
2. **ATTITUDINAL CONTENT (BE:** attitudes, values, awareness...)
3. **PROCEDURAL CONTENT (KNOW-HOW:** skills, procedures,...)

■ EDUCATIONAL STRATEGIES

Active, action-oriented learning is proposed in which students, true protagonists of the process, bring into play a broad set of knowledge, skills and personal attitudes, that is, the elements that make up the different **competencies that will enable the student/ to an ethical and critical intervention in climate action, in favor of sustainability and the transition towards a Carbon neutral future.**

The methodology that seeks to stimulate the Curriculum created by this project is based on a series of GENERAL PRINCIPLES, some already mentioned, which we summarize below:

1. Development of **active and participatory teaching** based on experiences and experiences, which facilitates the interest and future commitment of students.
2. Integrated i-STEAM approach promoting the development of critical thinking, scientific analysis and creativity, through the resolution of environmental problems about everyday life events and **educational activities that integrate**

all areas of knowledge and skills, including not only scientific ones, mathematics, technology but also artistic and creative ones.

3. Develop intellectual habits typical of abstract thinking, such as **observation, analysis, interpretation, research, creative capacity, understanding and expression and critical sense and the ability to solve problems and apply the knowledge** acquired in a variety of contexts, inside and outside the classroom.
4. Promote activities in **direct contact with the environment, the source or the problem**, through rapprochement and self-discovery. Outings and visits are a fundamental resource, which also arouses great interest. The **Service-Learning methodology** (which this project develops in a special way) responds to this principle.
5. Promote the **protagonism of students and the interaction and collaboration between them** through different techniques such as: the development of autonomous and group projects, learning based on projects and problems, dialogue, presentation and oral exchange.
6. Stimulate interest and the habit of **oral expression and communication**, as a basis for understanding, negotiation and conflict resolution.
7. Stimulate **reflection and critical thinking** not only about the topics but also about the learning process itself.
8. Stimulate **creativity, entrepreneurship** and effort as common elements.
9. Stimulate **awareness** by introducing resources that enhance sensations and emotions that help to empathize, helping to get involved in action and the search for solutions
10. Incorporate the use of **new media and technologies**, which is also especially interesting to **promote knowledge and exchange about the environment and new technologies and solutions between different European countries.**
11. Introducing the **recreational component** helps facilitate pleasant, fun and relaxed experiences that can have excellent educational results.

Within each of the Curriculum modules, suggestions for teaching-learning strategies are included, combining traditional techniques with innovation proposals that generate learning environments that enrich the educational process, also taking into account the possibilities offered by information and communication technologies.

The **service-learning methodology** is a type of innovative, motivating, collaborative and practical teaching technique that allows the student to become an active part of the process, which is why we suggest that whenever possible, **some of the proposed activities be developed from the approach to this teaching-learning method.**

To deal with the contents of each of the modules, some different strategies or techniques are included for Primary and Secondary (although in some cases some of them are repeated for both levels) as simple suggestions and as inspiration, and they can be developed in their entirety or just some of them, and in the proposed order or in which the group requires it, as well as adapting them to other specific aspects related to heritage if the teacher so wishes.

Therefore, we suggest a sequence of activities, ideas and curricular resources, but it will be the teachers who must mobilize a variety of media, both inside and outside the classroom; schedule outings and visits that encourage contact with the surrounding reality; schedule the completion of tasks that stimulate critical intervention capacities and the development of creativity, provide conditions for the participation of students in activities that require taking positions of an ethical nature; etc.

And above all it will be the teacher's mission to adapt the educational offer to the particular needs of his or her group and of each student, adapting to the diversity in the classroom.

In this curricular proposal we suggest activities following a logical order so that students progressively delve deeper into the contents covered, facilitating the acquisition of skills and the effectiveness of learning:

1. *INTRODUCTION: Approach to the topic - Motivation*
2. *KNOWLEDGE: Research - Analysis - Reflection and Criticism*
3. *GLOBALIZATION: Communication – Commitment - Action/Intervention*

In this scheme, teachers must be involved so as not to carry out a linear progression of learning, returning to previous questions if they consider it appropriate and introducing relationships of greater or lesser complexity, depending on the characteristics and age of the students.

Although the activities proposed in the Curriculum for primary and secondary school are mostly different, there is a similarity in the progression of both proposals, so teachers can rely on a resource from the other level, as long as they consider it interesting.

■ EVALUATION STANDARDS

Finally, the main evaluation standards are determined that the teachers can take into account when evaluating the development of each module and that they can make known to the students so that they know what the main objectives will be, which will be measurable in terms of evaluation criteria .

EDUCATIONAL CURRICULUM



Neutral Schools

II. CURRICULUM DEVELOPMENT



A

The environmental and climate crisis

MODULE 1. INTRODUCTION. ENVIRONMENT AND SUSTAINABLE DEVELOPMENT

The Environment can be considered as all the necessary natural resources for the survival and development of society, so its preservation becomes increasingly urgent as a main factor in the planet's sustainability.

The concept sustainable development was firstly used in 1987 in the *Report of the World Commission on Environment and Development: Our Common Future* by the United Nations Brundtland Commission. This concept is understood as the development that can respond to the needs of current societies without compromising the needs of generations to come and it is based on 3 fundamental pillars: economic viability, environmental protection, and social equity.

More and more frequently, the concepts of environmental and climate crisis appear as a call for attention and awareness about the consequences of climate change and the environmental situation of our planet. The most obvious changes are reflected in extreme temperatures, rainfall, and natural phenomena.

Considering the different studies carried out, scientists indicate human activity as the most likely cause for the more frequent occurrence of these phenomena and for the environmental situation we are experiencing today. They reinforce the emergency of the fighting against global warming once climate change affects the environment, health, and the economy globally.



Several consequences are highlighted, namely the risk of new pandemics, environmental disasters such as wildfires, rising sea levels due to ice melting, water scarcity in certain geographical areas, social inequality caused by all phenomena and many others.

In response to this awareness of the urgency in resolving this crisis, there are initiatives that seek to minimize the effects of the environmental and climate crisis, establishing specific and urgent measures to find solutions and raise awareness of the need to change behaviour/attitudes. One of the most relevant examples is the UN by creating the 2030 Agenda and the SDGs, namely the 13th sustainable

development goal that focuses on the climate situation, proposing urgent measures that involve education and the need for measures at a political level.

Defined in 2015, the 2030 Agenda consists of 17 Sustainable Development Goals (SDGs) and addresses various dimensions of sustainable development – social, economic, and environmental – with the aim of promoting peace and justice and building effective institutions.

Based on the knowledge acquired from the 8 Millennium Development Goals, which were created between 2000 and 2015, the 17 SDGs are the result of joint work by governments and citizens from around the world. They want them to be recognized as an assumption of common resolutions among world leaders and, consequently, by the population in general. Basically, we can interpret them as an agreement with the objective to transform Humanity.

The 17 SDGs were approved by all UN Member States, whose goal was to solve the needs of people and of all developed or underdeveloped countries, with the clear notion that no one or any country should be excluded. Each of the 17 SDGs focuses on a theme and can be divided into four main areas:

- Social: responding to human needs such as health, education, improving quality of life and justice.
- Environmental: focusing on the preservation and conservation of the environment, with actions related to the protection of forests and biodiversity, the fight against desertification, the sustainability of oceans and marine resources and the fight for climate change.
- Economic: focusing on the use and depletion of natural resources, waste production and energy consumption.
- Institutional: relating to global actions that can somehow implement the SDGs.



Image source: Pixabay

■ 1.1. OBJECTIVES

- To understand the concepts of Environment and Sustainable Development.
- To realize the importance of sustainable development for future generations.
- To recognize the impact of human behaviour on the environment.
- To know attitudes and strategies for sustainable development.
- To promote sustainable practices.
- To get to know the natural phenomena that cause climate change, such as the greenhouse effect.
- To recognize the main environmental, social, and economic consequences of the climate change at local, national, and global levels.
- To describe human activities that contribute to environmental and climate crisis.
- To identify prevention strategies to reduce the risk of environmental and social disasters.
- To understand the UN mission.
- To know the 17 UN Sustainable Goals.
- To organize the SDGs by area of sustainable development.
- To recognize the relevance of implementing the SDGs.

■ 1.2. COMPETENCES

- Development of skills related to research, collection of information and discussion of ideas.
- Recognition of the human action impact on the environment.
- Oral skills development of through work presentation, discussions and debates.
- Acquisition of writing skills acquisition with the creation of written texts of different types: argumentative and interviews.
- Civic feelings and democratic, social, and environmental values appropriation.
- Development of active participation in society.
- Development of research and oral production skills.
- Recognition of the impact of human action on the environmental and climate crisis.
- Acquisition of writing skills by creating texts of different types.
- Appropriation of civic feelings and democratic, social, and environmental values.
- Development of an active an active citizenship.
- Development of collaboration skills.

- Recognition of the importance of creating the 2030 Agenda.
- Appropriation of civic feelings, democratic, social and environmental values.
- Development of the ability for collaborative work and interaction.

■ 1.3 CONTENTS

1.3.1. CONCEPTUAL CONTENTS

- Environment and Sustainable Development:
 - Brief evolution of concepts.
 - Impact on society over recent years.
- Balance between economic, environmental, and social development:
 - Differences of the 3 areas.
 - Construction of areas balance.
- Human behaviour versus sustainable development:
 - Types of harmful behaviours.
 - Individual and collective attitudes
- Economic growth versus environmental aggression.
- Dangers caused by the environmental and climate crisis and its social and economic impact.
- Effects and impacts on ecosystems such as forests, oceans, and biodiversity.
- Sea level rise and its consequences.
- Migration episodes and social consequences in the organization of countries.
- Local, national, and global policies related to environmental and climate protection.
- United Nations (UN): history, mission, function.
- Agenda 2030: The 17 Sustainable Development Goals and intervention areas (SDGs).
- Concepts, causes, and impacts of the SDGs intervention areas.
- Challenges for the implementation of the 2030 Agenda: goals for each SDG, strategies, and action measures.

1.3.2. ATTITUDINAL CONTENTS

- Interest in implementing individual and/or collective sustainable practices.
- Showing curiosity on harmful actions for the environment.
- Participation in specific local actions.

- Collaboration between peers and with local society.
- Considering knowledge on the climate change important to mitigate the environmental, social, and economic impact.
- Showing interest in learning about strategies to protect the climate.
- Collaboration with colleagues to find solutions to the environmental and climate crisis.
- Recognition of personal impact on the environmental and climate crisis.
- Awareness of society's global role in protecting the planet.
- Recognition and awareness of the areas involved in the SDGs.
- Respect for the themes of the SDGs.
- Interest in causes and improvement actions in the SDGs areas.
- Identification of social, environmental, and economic problems in society.

1.3.3. PROCEDURAL CONTENTS

- Collection of information on the topics.
- Analysis of texts and presentation of ideas.
- Collaboration with colleagues.
- Use of digital tools.
- Participates in actions to promote concrete environmental preservation measures.
- Evaluates the impact of personal actions on the environment.
- Uses new technologies in the construction of dissemination instruments.
- Work in groups to find solutions.
- Planning activities that contribute to solving problems.
- Analysis of SDG topics and presentation of considerations on the themes.
- Reflection on the topics.
- Project work on the SDGS.

■ 1.4. EDUCATIONAL STRATEGIES

PRIMARY LEVEL:

- Reading activities – selection of simple texts on the environment and sustainable development.
- Brainstorming – group discussion about the meaning of the concepts.
- Carrying out educational games that develop knowledge about individual and collective sustainable development practices.
- Viewing films on the topic.
- Creative activities – illustration and crafts that promote children’s ideas about concepts.
- Viewing some advertising campaigns on the environmental and climate crisis.
- Picturing the past and the present in beaches, forests, oceans, cities, towns.
- Reconstruction of spaces before and after natural disasters.
- Making experiments to analyse natural phenomena like glaciers melting, wildfires, earthquakes, etc., and their influence on climate change.
- Eliciting ideas on personal and global attitudes towards the environmental preservation.
- Production of a good practices’ handbook.
- Study on SDGs’ illustrations – choose 3 SDGs and check their illustrations.
- Interpretation and articulation between the designs and the themes of the SDGs.
- Educational games using coding – creating stories and coding them through basic coding programmes for children.
- Creation of wish lists – choosing some SDGs, preparation of wish lists on the topic.
- Oral presentations of solutions to fight against environmental and social problems.
- Celebration of a date related to the SDGs, with integration or support activities according to the chosen objective(s).
- Creative activities – representation of a sustainable development goal through drawing, poetry, or drama.
- Field trip to find out about sustainable development activities within the community:
 - Searching for polluted places.
 - Taking pictures and drawing polluted places and types of litter found.
 - Posting work done/pictures collected on the internet to call the attention to the problem.

- Sending information to the local newspapers
- Organising litter clean up campaigns to clean the places found
- Sharing the problem within the community

SECONDARY LEVEL:

- Research on the origin of the concepts, environment and sustainable development, and their evolution up to the present day.
- Debate on the advantages/disadvantages of sustainable practices.
- Visits to local companies and institutions to learn about environmental practices.
- Interviews with local institutions and companies about adopted practices.
- Creative work on an environmental problem and proposed resolution with community involvement.
- Project work – case study: a natural disaster, causes and consequences.
- Viewing films/documentaries on the environmental-climate crisis and reflecting on own behaviour.
- Development of an action project – adoption of a cause and following procedures.
- Creation of a blog about the environmental and climate crisis
- Research on personalities who stand out in the fight against the environmental and climate crisis.
- Research on the United Nations – structure, organization, functions.
- Collaborative work – dividing the class into groups, each one responsible for researching 3 objectives, indicating the sector of society involved and the changing agents.
- Creation of a mural where each student writes the practices of their home, the neighbourhood, and the city where they live, related to the sustainable objectives studied.
- Awareness campaigns about the chosen SDGs – creation of posters, pamphlets, videos.
- Presentation of proposals for changes in the school environment – oral presentations in the school environment of the work carried out.
- Celebration of an important date related to the SDGs, with integration or support activities, according to the chosen objective.
- Creative activities – representation of a sustainable development objective through drawing, poetry, or dramatization to school community.
- Making experiments to analyse and explain natural phenomena like glaciers melting, wildfires, earthquakes, etc., and their influence on climate change.

■ 1.5. EVALUATION STANDARDS

Speaking: ability to present and discuss ideas.

Writing: practical knowledge of the structure of different written texts.

Attitudinal: interest and commitment with activities and interaction, empathy towards the problems related to the topics.

Knowledge: understanding of the concepts conveyed in the SDGs; ability to relate different concepts, causes and possible solutions.



MODULE 2. CLIMATE CHANGE: ORIGIN, CONSEQUENCES AND SOLUTIONS

Climate change is undoubtedly one of the greatest challenges, if not the greatest, that humanity will face during this century. The obvious difficulties in achieving a global and effective policy response derive from the multi-causality of the problem and the importance of aspects related to the dominant system of production and consumption, especially that of the most advanced societies, whose standards of living tend to be generalized and imitated worldwide.



It is vital to educate to face, from an eco-social and global approach, the challenge that the climate and energy crisis represents for today's societies and to raise awareness of the repercussions it will have for future generations.

The purpose of this module is to raise awareness, train and educate about the threat of climate change and its causes and about the possible alternatives to mitigate and prevent its consequences, from a global approach, taking into account all the existing interrelationships, and considering the environmental, social and economic dimensions associated with the causes and consequences of climate change, in order to further explore in the following modules the different solutions in a specific way.

It is important to know the new strategies and technologies for mitigation and adaptation to climate change. In addition, the necessary social and institutional transversality of the climate challenge demands that the international context of climate action must be made known.

In order to make the complexity of climate change understandable and to enable people to participate in its solutions, the scientific approach is undoubtedly fundamental, so in order to deepen the global understanding of climate change, scientific knowledge and skills will be enhanced.

Climate change is produced through the relationships we maintain with other people, and therefore we propose the need for activities to encourage group discussion and debate. Consequently, we will try to encourage the capacity of expression, communication and empathy, through creative, dialogue and communication skills, since the fight against climate change and the transition to a future with less energy consumption and less dependence on fossil fuels requires dialogue, positive vision, commitment and imagination for the implementation of new imaginative solutions driven by the citizen community.

■ 2.1. OBJECTIVES

- To raise awareness of the complexity of the phenomenon of climate change and the challenge it represents for humanity and the whole planet.
- To equip students for the critical analysis of the effect of human activities on climate change.
- To raise awareness of the serious ecological and environmental consequences of climate change as well as its economic and social implications, both for present and future societies.
- To raise awareness of the need to contribute individually and collectively to the solutions that need to be implemented to prevent, mitigate and adapt to the climate crisis.
- To inform about the institutional context of the fight against climate change at international and European level and the fundamentals of the European objective of the transition to a carbon neutral economy.
- To make students aware of the need to accompany the most vulnerable groups and countries in the transition process.
- To raise awareness of the need to make decisions, manage and act thinking not only about the short-medium term consequences but also about the long term.
- To disseminate the importance of national, European and international institutions as well as international commitments in favor of cooperation, sustainability and the Sustainable Development Goals.

- To inform about the importance of the UN Sustainable Development Goals most directly related to the climate challenge: need for energy transition towards the use of clean energy sources and climate action to combat climate change and its effects.
- To contribute to an active engagement in the fight against climate change through analysis and reasoned and dialogue-based positioning on issues related to this problem.
- To train to contribute to climate change mitigation and adaptation through commitment and initiatives in favor of common values, environmental improvement and community service.
- To create commitment in the fight against climate change and encourage the active and democratic citizenship through respectful, dialoguing and constructive participation and collaboration.
- To train to contribute to the achievement of a safer, more supportive and sustainable world.

■ 2.2. COMPETENCES

- Understanding the evidence of the current climate crisis caused by human activities.
- Understanding the complexity of the phenomenon of climate change in terms of its causes, consequences and solutions, being aware of the challenge it represents.
- Ability and willingness to contribute individually and collectively to the solutions that need to be implemented to avoid the worst possible scenarios of the climate crisis.
- Be conscious of the fragility of ecosystems and the environment in general in the face of climate change, also recognizing the importance of the environment as an essential part for wildlife and human societies.
- Relating, with scientific basis, climate change with its consequences on the environment, the preservation of biodiversity, the quality of life of people and other environmental, social and economic implications.
- Ability to develop creative sustainable solutions to prevent, correct, mitigate and adapt to climate change.
- Acknowledge the need for international and national agreements, plans and programs to combat climate change.
- Valuing the importance of the UN Sustainable Development Goals most directly related to the climate challenge: to understand the need to promote the use of non-polluting energy sources and to adopt urgent measures to combat climate change and its effects.

- Understanding the need to set the conditions of a carbon neutral economy by involving all administrations and all actors in society as well as the scientists.
- Recognizing the importance of national, European and international institutions as well as civil associations in the fight against climate change and international commitments in favor of cooperation, sustainability and the Sustainable Development Goals.
- Ability to contribute to climate change mitigation and adaptation and hence to individual and collective well-being.
- Commitment to the fight against climate change and active role in accordance with own skills, aspirations, interests and values.
- Ability to analyze the main current conflicts surrounding the climate emergency, the energy crisis and energy security and poverty.
- Selecting and applying different alternatives to curb climate change and achieve the Sustainable Development Goals, justifying in an argumentative, critical and constructive way the ethical duty to protect and care for our environment.
- Considering different scientific, political and ethical approaches to face the climate emergency and the environmental crisis through the exposition and argumentative debate about them.
- Global vision of the existing ecological, economic and social problems related to the climate challenge.
- Valuing the need for an energy transition, identifying its main challenges both in the immediate environment and at international level, recognizing the global repercussions of individual acts.

■ 2.3. CONTENTS

2.3.1. CONCEPTUAL CONTENTS

- Understanding the concepts of greenhouse effect, global warming and climate change as global phenomena and the causes of these problems.
- Knowing the main human activities and sources of anthropogenic greenhouse gas emissions.
- Understanding the consequences of climate change, as well as the vulnerability and risk associated with its impact on natural ecosystems and the living conditions of the human population.
- Understanding the risks and impacts that different human actions may have on the climate, especially those related to energy production and consumption.
- Knowing the repercussions of climate change on the environment, the economy and society: Extreme weather phenomena and thermal and hydric stress. Melting of ice and flooding in coastal areas. Shifting of geographic distribution ranges (to higher latitudes), changes in cyclic and seasonal natural

patterns of species and their interrelations. Negative effects on agricultural production. Increase in forest fires. Behavioral changes in animal and plant species. Loss of biodiversity. Droughts. Water and food shortages. Increase in displaced population and migratory movements due to loss of inhabited areas. Increased poverty. Spread of diseases. Changes in traditional crops. Crisis in the tourism sector. Change in employment patterns. Etc.

- Understanding and facing from an eco-social and global approach, the challenge represented by the climate, energy and environmental crisis for current and future societies, taking into account the existing interdependence and eco-dependence relationships.
- Identifying the main challenges of climate action and energy transition, both in the immediate environment and at the international level, recognizing the global repercussions of individual actions.
- Knowing the institutional context of the fight against climate change at international and European levels.
- Knowing the UN Sustainable Development Goals in relation to climate change, understanding the need and urgency of promoting the use of clean energy sources and adopting urgent measures to combat climate change and its effects.
- Describing the action measures for adaptation and mitigation of the effects of climate change.
- Understanding the main strategies for mitigation and adaptation to climate change, as well as the new technologies for emissions prevention and carbon capture and storage, as solutions to the climate challenge.

■ 2.3.2. ATTITUDINAL CONTENTS

- Awareness of the complexity of the phenomenon of climate change and the challenge it represents for humanity.
- Attitude of reflection, curiosity and critical analysis of the economic, environmental and social reality around the problem of climate change.
- Collaborative attitude to know, understand and solve the problems related to the energy and climate crisis.
- Active commitment to the fight against climate change, common values, environmental improvement and community service, through involvement in activities at school or at their local environment.
- Interest in the contribution of science to the solution of the climate and environmental crisis.
- Positive and proactive attitude towards responsible, healthy, sustainable and environmentally friendly habits, in accordance with their own aptitudes, aspirations, interests and values.

- Awareness of the need for a carbon neutral economy and lifestyle that involves the whole society.
- Value the importance of accompanying the most vulnerable groups in the process of energy and ecological transition.
- Recognition of the importance of the work of individuals, groups and organizations involved in the fight against climate change and environmental protection.
- Empathetic attitude towards other people when identifying, managing and communicating ideas, emotions and desires.
- Autonomous moral position through dialogue and rational and ethical deliberation, respectfully contrasting different values and life styles.
- Awareness of the need to curb climate change and achieve the Sustainable Development Goals, justifying argumentatively, critically and constructively the ethical duty to protect environment.
- Reflective attitude towards the different scientific, political and ethical approaches to address the climate emergency and the environmental crisis.

■ 2.3.3. PROCEDURAL CONTENTS

- Search, select, organize, contrast and analyze information from different reliable sources about the causes, consequences and solutions to climate change.
- Present the information and data obtained using the format of texts, tables, small reports and digital tools.
- Cooperate and collaborate actively in the use of digital resources in a responsible, respectful, civic and ethical manner.
- Analyze concepts and processes related to the climate crisis, interpreting information in different formats (texts, models, graphs, charts, tables, diagrams, schemes, concept maps, symbols, books, websites...).
- Pose questions and hypotheses about the climate crisis that can be answered or contrasted using scientific methodology and through written texts or Internet searches.
- Analysis and interpretation of the information and results obtained, assessing the consistency of possible solutions and comparing them with the predictions made.
- Design and carry out simple experiments in order to answer specific questions and test hypotheses.
- Collection of quantitative or qualitative data in research using different tools, methods and techniques, including digital ones.
- Interpret the results obtained in research projects using simple mathematical and technological tools.

- Discuss and make predictions showing and maintaining curiosity, respect and critical sense.
- Establish connections between different elements or systems of the socioeconomic and environmental context showing respect and reasoned understanding of the relationships.
- Communicate and disseminate the results of research, establishing relationships between the knowledge and information acquired, preparing reports, presentations or informative dossiers.
- Explain processes related to climate change using knowledge, data and information but also logical reasoning or digital resources.
- Analyze the main current conflicts regarding the energy crisis and energy security and poverty.
- Debate the ecological, economic and social problems related to the climate challenge with a global world vision.
- Design and develop artistic or creative productions to explain problems related to climate change, at different temporal and spatial scales.
- Present the final result of an individual or group project, sharing and critically evaluating its elaboration, the difficulties encountered, the progress and the achievements attained.
- Make collective decisions, plan coordinated actions and solve problems by applying civic, ethical and democratic procedures and principles.
- Participate individually and/or cooperatively in the search, contrast and evaluation of proposals to face the climate challenge, seek solutions and act for its resolution.

■ 2.4. EDUCATIONAL STRATEGIES

PRIMARY LEVEL:

- Draws on Climate Change. In order to introduce the topic and to know the previous ideas that students have about climate change, students will explain through texts and/or drawings, what climate change consists of. The subsequent ideas sharing will also allow them to begin to reflect on the problem.
- Educational videos or didactic presentations can be used to explain the main concepts and problems related to climate change (such as the difference between climate and weather, the greenhouse effect or global warming, among others) in a didactic and entertaining way. Below are some suggestions for Primary level:

The Greenhouse Effect. NASA Climate Kids. <https://www.youtube.com/watch?v=SN5-DnOHQmE>

What causes sea level rise? <https://www.youtube.com/watch?v=QH-KYmRAzOA>

Climate change for kids <https://www.youtube.com/watch?v=WkvPdUtYhX8>

Global warming <https://www.youtube.com/watch?v=PqxMzKLYrZ4>

- Search, organize, present in graphs and analyze data on temperatures and precipitation (average, maximum and minimum) of the last decades in the town or in other cities/countries that the teachers consider relevant (in Europe or even the world). Draw conclusions about the changes that are occurring in weather and climate, locally (and globally). Provide the sources of information (National or International Meteorological Agencies) or directly the meteorological data, depending on the level.
- Provide the students by groups some statements around the causes, consequences and solutions of climate change based on UN Climate Action Data (<https://www.un.org/es/climatechange/science/key-findings>) for them to complete the information with some inquiries and finally to share the results. For example:

“Emissions that cause climate change come from all parts of the world and affect us all, but some countries produce far more than others. The 100 countries that emit the least generate 3% of total emissions. The top 10 emitters contribute 68%” Find out which 10 countries contribute the most greenhouse gas emissions.

“The Earth is currently 1.1 °C warmer than it was in the 19th century. Climate change is a huge challenge, but we already know many solutions. We have global agreements to guide progress, such as the Paris Agreement.” What is the temperature increase from pre-industrial levels that was agreed at the Paris Summit as the upper limit this century to avoid the worst consequences of climate change?
- Posters on International Summits on Climate Change. Students will look for information about the event chosen (organizer, participants, objectives, conclusions, news...) trying also to express their opinion about the importance of these meetings and international organizations in the fight against climate change.
- Contest “Looking for solutions”. After a brief introduction on the main existing solutions and categories of action to the climate challenge (reducing gas emissions, mitigation and adaptation to the effects of climate change, carbon sinks and other capture and storage systems, financing the necessary adjustments for the transition, solidarity with developing countries, etc.), a competition of ideas will be proposed, as original but realistic as possible, on how we can contribute to develop and improve these solutions.
- Debate “Why is energy so expensive?” Debate on the energy crisis, raising questions such as: *Why has energy become so expensive in Europe in recent years? What solutions are being sought? Why is it so important to guarantee energy security by the states? Have you heard of energy poverty? Relationship between wars and energy (supply, prices, etc.). Energy security and energy poverty.*
- Drawing-painting contest “Climate change and future generations”. Participants will paint their vision of how future generations will experience climate change.
- Exhibition with all the resulting works of previous activity, to be contemplated by the educational community, or even open to the people of the neighborhood or the city. The media can be informed or called in to publicize the initiative and thus reach more people to raise awareness on the urgency to act and think in the long term in order to ensure next generations do not suffer the most dramatic consequences.

SECONDARY LEVEL:

- Introduction of the topic through news, as recent as possible, that have appeared in the media concerning to problems or catastrophes related to climate change (floods, droughts, forest fires, etc.) that we provide in order to explore the students' opinions and previous knowledge. Another alternative is to ask students to search for regional, national or international news themselves.
- Debate on the different dimensions of the problem: What are the causes of climate change? What consequences are happening and how do they affect nature and people? Are the consequences felt equally all over the world? Who is most likely to be affected in the world? And in Europe? And in our country? What are the main solutions to the problem? Who should act to fight climate change? Why?
- Educational videos. Watch educational videos that explain in a didactic, visual and entertaining way the main concepts such as (difference between climate and weather, greenhouse effect, global warming). Some suggestions for Secondary level:
 - The Green House Effect* <https://www.youtube.com/watch?v=RiqJ01kHZns>
 - The Green House Effect* <https://www.un.org/es/climatechange/what-is-climate-change>
 - Seafloor spreading* <https://www.youtube.com/watch?v=G4nDcczMoBw>
 - Human impact on resources* <https://www.youtube.com/watch?v=TM0BntXImCI>
- Researches. A simple test will be provided with a few yes/no questions about a topic of the teacher's choice, to be answered individually and anonymously. After that, the class is organized into groups to search for the correct answers to the questions through various means, taking note of the sources they have used for each question, after which there will be a discussion between the different groups on the answers found, discussing and testing their claims in relation to the sources consulted, trying to reach a consensus on the correct answers to each of the questions.
- Surveys. Subsequently, each group should conduct the same survey to a certain number of people in their environment, anonymously but also noting some information about each respondent such as age, sex, level of education, interest in the environment or involvement in environmental behavior. After several days, all the surveys collected by the class will be gathered and the analysis of the answers will be carried out, organizing them in differentiated boxes according to the variables considered (men, women, different age groups, level of studies, etc.), calculating for each group considered the proportion of correct answers for each question and the average score on the test.
- Reports. Students will work again in groups to elaborate a report with the results of all the surveys, graphically representing the results and drawing conclusions about the profiles of people who best know the topic that was surveyed, being able to express the results to expose them to the other groups (posters, presentations, dossiers or in a more creative way).
- Analysing data. Making an analysis of possible future scenarios of climate change evolution, using carbon dioxide emission forecasts developed by

the Intergovernmental Panel on Climate Change-IPCC (open to all member countries of the United Nations and the World Meteorological Organization) that publishes its carbon dioxide projections in the Special Report on Emissions Scenarios (SRES). Groups can be organized to draw conclusions on the climate change situation and its consequences according to each of the seven possible scenarios it presents.

- Communicating the conclusions of the analysis, through the medium of their choice, allowing creativity in their presentations. A press release can be prepared or the media can be called up to publicize the initiative and thus contribute to raising awareness of the urgency of reaching agreements on emissions reduction.
- Role play or debate on the energy crisis, raising questions such as: Why has energy become so expensive in Europe in recent years? Why is it so important for States to guarantee energy security? Have you heard of energy poverty? War in Ukraine. Energy security and energy poverty. It can be also set up as a role play so that each participant tries to give his/her opinion in the debate as if he/she were a character, e.g.: conservative politician, progressive politician, politician of the Green group, businessman of an energy multinational, scientist, journalist, several citizens, etc.
- Mapping the climate change. To observe the relationship between global development mapping and climate change. Identify the level of human development in different regions of the planet and use this information to analyze inequalities in the spatial distribution of natural resources and vulnerability to environmental threats.
- Interactive online game “Climate Challenge”. This is a game that proposes that the future of the Earth is in our hands. The game poses that the player is the president of the European Nations. He/she must make decisions to address climate change while trying to maintain his/her popularity among voters to stay in office, but always taking into account what the science says about the climate challenge.

https://www.bbc.co.uk/sn/hottopics/climatechange/climate_challenge/

- Debate on the controversial forms of protest and visibility of the problem of climate change, chosen by some climate activist organizations.
- Design a campaign to raise voice, inform and encourage others to join in climate action. Students will decide what outreach materials, messages, logos and media they will use to encourage action. In addition to other actions, the campaign can include an exhibition in the school with information panels incorporating text and other resources (photographs, graphs, maps, etc.), an information brochure summarizing the objective and content of the exhibition, and even guided tours conducted by the students on an Open Day. They can also choose different groups to focus specifically on the campaign such as: neighbors, colleagues, friends and family members to act individually and collectively; business people who can support bold changes that contribute to mitigate the problem; local and global leaders to act from their institutions; etc.

- Dissemination. The program can be disseminated through the local media, for which a press release can be prepared; announcements on the center's website or invitations to parents' associations, companies, city hall or other organizations.

■ 2.5. EVALUATION STANDARDS

- Knowledge: understanding of the concepts and ability to relate different concepts, causes and possible solutions.
- Understanding of the complexity of the phenomenon of climate change and the effect of human activities on climate change.
- Knowledge of the institutional context of the fight against climate change at international and European level
- Understanding the fundamentals of the European objective of the transition to a carbon neutral economy.
- Understanding of the challenge climate change represents for humanity and the whole planet.
- Understanding and valuing the European Union's cutting-edge work in implementing measures to combat climate change.
- Attitudinal: interest and commitment to activities and group interaction, empathy towards the problems inherent to the topic.
- Attitudinal: awareness of the need to contribute individually and collectively to the solutions that need to be implemented to prevent, mitigate and adapt to the climate crisis.



B

The Eco-Energy transition

MODULE 3. TOWARDS THE ECOLOGICAL-ENERGY TRANSITIONS AND CLIMATE NEUTRALITY

Climate change is already evidence shown through extreme meteorological phenomena (sudden floods, heat waves, prolonged droughts, accelerated melting of glaciers, etc.) that confronts us daily with the need to act quickly on multiple fronts with the objective to mitigate its effects.

The main objective in our schools is to awaken the community awareness and critical understanding of the phenomena resulting from climate change, which constitutes a strong threat to community life at a global level as well as to Sustainable Development. Its importance, as a threat to our well-being, was immediately highlighted by the UN in 2015 when all its Member States adopted the 2030 Agenda, being climate change action the 13th objective of the SDGs whose purpose is to adopt measures to fight against climate change.



Following the 2030 agenda, the Paris Agreement was signed in 2015. It consists of an international agreement whose objective is to fight against global warming, the responsible for climate change. For that purpose, a set of actions to be followed by the signatory countries was established with the aim of reducing the emission of greenhouse gases.

The European Union has always been at the forefront in implementing measures to fight against global warming, either through a set of actions translated into the European Green Deal, a roadmap to achieve carbon neutrality in 2050, or through

financing for non-EU countries with lower economic development allowing them to implement climate action measures and the implementation of the Paris Agreement.

Another objective of teaching these contents is to encourage a responsible behaviour in our students to prevent climate change. This can be achieved either through education to change consumption habits, or through students' actions within their family or community as true agents promoting climate change through an active citizenship.

■ 3.1. OBJECTIVES

- To go over the main causes of climate change: burning of fossil fuels, deforestation, agricultural practices, and the greenhouse effect.
- To relate climate change (sudden floods, heat waves, prolonged droughts, uncontrolled forest fires, accelerated melting of glaciers, changes in plant growth, etc.) with the burning of fossil fuels.
- To know the actions of international institutions (UN, EU) in fighting against climate change (Paris Agreement, COPs, European Green Deal, etc.).
- To know the objectives and action plan of the Paris Agreement on fighting against climate change.
- To realize that change must be a collective action of all Nations, but also of each one.
- To know the objectives of carbon neutrality pursued by the European Union.
- To recognize the need of having the fight against climate change as essential in the European Union's foreign affairs.
- To recognize that the global energy transition is a crucial element in achieving climate neutrality.

■ 3.2. COMPETENCES

- Responsible behaviour acquisition in preventing climate change.
- Becoming true agents of change in the family and the community.
- Being able to search for solutions to the climate crisis, using digital technologies.
- Motivation towards sustainable habits.
- Environmental awareness and active citizenship.

■ 3.3. CONTENTS

3.3.1. CONCEPTUAL CONTENTS

- Main causes and consequences of climate change.
- Mitigation and adaptation to climate change.
- The Kyoto Agreement as a predecessor to the Paris Agreement
- The Paris Agreement and its main objective.
- Chronology of the Paris Agreement and COPs.
- Objectives and benefits of the European Green Deal.
- The European Ecological Pact: a fundamental instrument for carbon neutrality.
- The main measures of the European Green Deal:
 - Construction of a new economic model.
 - Transition to more ecological mobility based on clean, accessible, and affordable transport.
 - European industry based on non-polluting technologies and products.
 - Increasing the shares of energy use from non-polluting sources and improve energy efficiency.
 - Renovation of homes and buildings, allowing to energy saving and guaranteeing protection against extreme temperatures and fighting energy poverty.
 - Using natural resources sustainably.
 - Boosting climate action globally.
- The Directorate-General for Climate Action: mission and responsibility.
- Climate neutrality. EU climate change challenge for 2050.
 - What is climate neutrality.
 - What carbon neutrality 2050 consists of.
 - How to achieve carbon neutrality.
- Climate denialism (denial of the phenomenon of human responsibility, of the risks involved, of the need to act).

3.3.2. ATTITUDINAL CONCEPTS

- Responsible consumption habits for preventing climate change (recycling, reducing consumption of disposable products).
- Reduced energy consumption (household appliances with lower energy consumption, using environmentally friendly vehicles).
- Group cooperation in carrying out and presenting tasks on the topic of climate change.
- Engaging in active citizenship activities.

3.3.3. PROCEDURAL CONTENTS

- Mobilization of knowledge acquired in the classroom by acting for a real change in the world.
- Sharing the knowledge acquired in a family environment.
- Research and analysis of information obtained from different sources.

■ 3.4. EDUCATIONAL STRATEGIES

PRIMARY LEVEL

- News analysis related to climate change.
- Writing media news on climate change/carbon neutrality.
- Creating comic strips on natural elements and their importance to environmental balance.
- Drawing natural elements and telling their stories from environmental balance to climate change.
- Watching documentaries to raise children's awareness to climate change.
- Creating a school weekly second-hand goods exchange market with the collaboration of the whole community.
- Creating a recycling bin corner in each classroom and motivate students to always separate the litter.
- Making experiments to show the factors that cause the greenhouse effect.
- Building a greenhouse to show how the greenhouse effect works.

SECONDARY LEVEL

- Debates on possible solutions to reconcile economic growth with human development and environmental balance.
- Participation in or development of solidarity campaigns to transform citizens into active participants in the fight against climate change.
- Research work on the global measures to fight against climate change.
- Creative work on measures to be suggested to fight against climate change.
- Creating scale models of buildings with different kinds of materials to understand the effects of climate change in comfort inside a building.
- To do list of measures taken by students to help the fight against climate change.
- Interviews with the population to know about climate change actions and conclusions posted on school and local newspapers.
- Documentary work involving the eldest generation and the youth:

- Finding out about the eldest perception on environmental changes by interviewing older people.
- Comparing now and then.
- Researching the causes of environmental changes.
- Deciding on the actions to be taken to reduce/stop climate change.
- Presenting the work to the community.

■ 3.5. EVALUATION STANDARDS

- Speaking: ability to present orally (individually or in groups)
- Knowledge: understanding of the concepts and ability to relate different concepts, causes and possible solutions.
- Understanding and valuing the European Union's cutting-edge work in implementing measures to combat climate change.
- Attitudinal: interest and commitment to activities and group interaction, empathy towards the problems inherent to the topic.



MODULE 4. RENEWABLE ENERGIES AND CLEAN ENERGIES

Renewable energies are naturally replenished energy sources that may cause pollution but are sustainable in the long term and do not contribute to climate change.

Clean energies do not pollute and are generated through renewable sources without waste or impact to the environment.

These energies include energy generated from renewable sources and energy generated by technologies, and their objective is reducing the negative environmental impact associated with energy generation.



Incorporating renewable energy and clean energy topics into primary and secondary school curricula is essential for several key educational reasons. First and foremost, it prepares students for the future. As our world shifts toward eco-energy transitions to achieve a climate-neutral and more sustainable future, understanding renewable energy sources and technologies will be critical. By integrating these subjects early in education, students develop a foundational knowledge that can inspire interest in careers in science, technology, engineering, and mathematics (STEM), which are vital for advancing clean energy innovations.

Additionally, teaching about renewable and clean energies fosters environmental stewardship. Students learn about the environmental impacts of traditional energy sources and the benefits of sustainable alternatives. This knowledge encourages responsible behaviour and informed decision-making, helping students become environmentally conscious citizens who can contribute to sustainable practices in their communities.

Moreover, the inclusion of renewable energy education supports interdisciplinary learning. It connects various subjects such as science, geography, economics, and social studies, providing a holistic understanding of the global energy landscape and the interconnectedness of environmental, economic, and social factors. This approach enhances critical thinking, problem-solving, and analytical skills, equipping students with the tools to address complex global challenges.

In summary, integrating renewable and clean energy topics into primary and secondary education is crucial for equipping future generations with the knowledge and skills needed for a sustainable, climate-neutral future. It promotes environmental responsibility, supports interdisciplinary learning, and prepares students for careers in critical sectors of the economy.



Photo source: Pixabay

■ 4.1. OBJECTIVES

- Distinguish renewable energy sources from clean energy sources.
- Identify sources of renewable and clean energy, namely: Solar Energy (photovoltaic and thermal); Wind energy; Bioenergy (Biomass, Biogas; Biofuels); Hydroelectric energy; Geothermal energy; Sea Energy (Tidal Energy, Current Energy, Wave Energy, Thermal Gradient Energy); Hydrogen Energy.
- Develop practical skills and deepen understanding of renewable energy technologies and their applications.
- Characterize the different sources of renewable energy.
- Know the advantages and disadvantages of using renewable and clean energy sources.
- Compare renewable and clean energy sources with other energies: Nuclear Energy (fission and fusion), cogeneration, coal, gas.
- Recognize the advantages of implementing global policies that encourage the production and use of alternative energies.
- Critically analyse the environmental, social, and ethical impacts on improving the quality of life of human populations.

■ 4.2. COMPETENCES

- Recognition of the importance of renewable and clean energies.
- Ability to understand the importance of renewable and clean energies.
- Acquisition of environmental values.
- Commitment to use renewable and clean energies.
- Expression of thoughts and ideas related to renewable and clean energies.

■ 4.3. CONTENTS

4.3.1. CONCEPTUAL CONTENTS

- Application of renewable energy and clean energy concepts to identify choices that encourage rational and sustainable use of energy.
- Analysing renewable and clean energies.
- Comparison of different processes for exploring energy sources.
- Identification of various energy production processes.
- Distinction of renewable and clean energy sources.
- Comparison of advantages and disadvantages of using renewable and clean energies and other energies.

4.3.2. ATTITUDINAL CONTENTS

- Participation in actions that promote sustainable management of energy resources.
- Recognition of the importance of knowledge about alternative energies in the energy and ecological transition process.
- Understanding energy transition and respecting differences of opinion and diversity.
- Development of attitudes and values that contribute to the promotion of responsible behaviours.
- Valuing the use of clean and renewable energies.

4.3.3. PROCEDURAL CONTENTS

- Autonomous research using different sources.
- Creation of graphics, diagrams, posters, and models.
- Comparing different kinds of energies.
- Project work.

■ 4.4. EDUCATIONAL STRATEGIES

PRIMARY LEVEL:

- Reading simple texts about renewable energy sources.
- Carrying out activities in pairs and groups – creating panels, posters, leaflets.
- Creation of stories in which characters teach how to use several types of energy.
- Roleplaying on the use of several types of energy.
- Viewing of short film on the topic to raise children's awareness to the several kinds of existent energy and how they can be used.
- Carrying out educational games about individual and collective sustainable energy.
- Preparation of a manual of good environmental practices.
- Energy projects: Conduct simple experiments or projects to demonstrate renewable energy sources such as solar, wind, and hydro power. For example, build a small solar-powered car or windmill.
- Construction of prototypes of renewable energy sources using natural elements, examples: windmills, water mills, wave energy, etc. Exhibition to the community.

SECONDARY LEVEL:

- Research work on renewable energy and clean energy and energy production processes.
- Debates on the advantages and disadvantages of using renewable and clean energy sources.
- Excursions to renewable energy facilities. Students visit wind farms, solar plants, and other facilities to closely understand green technologies. This allows them to visualize energy generation without carbon emissions.
- Study visits to companies, research centres and places that fit into the themes under study.
- Interviews with local companies about the practices adopted.
- Awareness campaigns about the importance of clean and renewable energy, both in schools and locally, by means of digital technology.
- Visualization/creation of films/documentaries/reports on the topic.
- Creation of Science Clubs focused on energy transition, environmental education, and climate change.
- Preparation of a manual of good practices promoting the rational and sustainable use of energy.
- Construction of sustainable energy prototypes: solar oven, solar powered cars, electrical cars, wind-mill boat.
- Renewable energy projects: Design and build small-scale renewable energy systems, such as solar panels, wind turbines, or bioenergy models. They can also calculate the potential energy savings for their school or community.
- Exhibition competition addressed to the community in which several forms of energy are shown and displayed (antique ironing tool, solar oven, etc.)

■ 4.5. EVALUATION STANDARDS

- Speaking: ability to present orally (individually or in groups).
- Knowledge: understanding and being able to relate different concepts, causes and possible solutions.
- Attitudinal: interest and commitment to activities and group interaction, empathy towards the problems inherent to the topic.

MODULE 5. ENERGY SAVING AND ENERGY EFFICIENCY

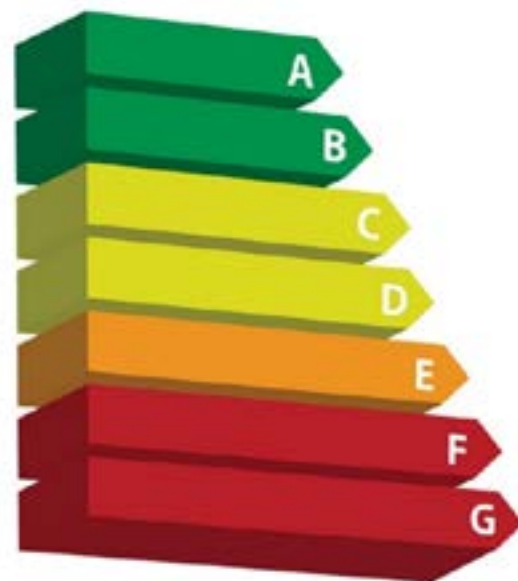
This curriculum typically focuses on the principles, strategies, and practices associated with saving energy and enhancing efficiency in various contexts. It aims to educate individuals about the significance of energy conservation and the methods to achieve it.

Energy savings refer to the reduction in the overall energy consumption compared to a baseline or standard level, resulting in a decrease in the total energy used. It involves the strategic and intentional effort to use less energy while maintaining the same level of productivity or achieving the same outcome. The primary objective of energy savings is to decrease energy usage without compromising the quality of services or products provided.

Energy efficiency refers to the utilization of less energy to provide the same level of output or service. It's the measure of how effectively energy is utilized to produce a specific output, whether it's in the form of work, heat, or light. The primary goal of energy efficiency is to optimize energy consumption while maintaining or even improving performance.

These two concepts are the key points for a more sustainable future, for a better life quality and for a better management of our own resources, that's why is very important for schools and for students to understand and internalize these two concepts so they can be aware and being able to carry out small or big changes in their lives, and in others lives.

There are some other concepts more difficult to explain and adapt for schools like energy market or energy labels, but those two, energy saving and energy efficiency are more important and simpler, and more than enough to create awareness in students.



5.1. OBJECTIVES

- Students should comprehend the fundamental principles of energy, its sources, conversion, and utilization, including the difference between renewable and non-renewable energy sources.
- Students should be able to identify and describe various strategies and methods for conserving energy in different contexts, such as residential, commercial, and industrial settings.

- Students should gain knowledge about energy-efficient technologies and their applications, understanding how these technologies work and their impact on reducing energy consumption.
- Students should understand the role of human behavior in energy consumption and be able to advocate for and implement behavioral changes that contribute to energy savings.
- Understanding market and governmental policies, regulations, and incentives related to energy efficiency, and how these policies influence energy practices and industries.
- Students should be able to communicate the importance of energy savings and efficiency, both in written and verbal forms, and advocate for these practices in their communities or workplaces.
- Develop awareness of individual capacity to make small decisions that can improve energy saving and efficiency.
- Raise individual awareness related with climate change and energy saving and efficiency.
- Understand the energy labels and home automation as a useful tool for energy saving and efficiency.

■ 5.2. COMPETENCES

- Technical competence: Understanding the technical aspects of energy-saving devices, energy-efficient systems, and technologies. This involves knowledge of energy conservation measures and the ability to assess, recommend, and implement these technologies in various contexts.
- Analytical skills: Developing the ability to analyze energy consumption patterns, identify inefficiencies, and propose solutions to improve energy usage in different settings, such as households, industries, and commercial spaces
- Problem-Solving abilities: Developing the capacity to identify energy-related problems, think critically, and devise effective strategies to address energy inefficiencies.
- Knowledge of environmental impact: Understanding the environmental impact of energy usage, including carbon emissions, and the ability to analyze and compare different energy sources in terms of their ecological footprint.
- Regulatory awareness: Familiarity with energy policies, regulations, and incentives related to energy efficiency. This includes understanding how these policies influence decision-making in different sectors and being able to navigate legal frameworks.
- Interdisciplinary understanding: Appreciating the interdisciplinary nature of energy efficiency, combining knowledge from different aspects.

- Communication skills: Being able to effectively communicate and advocate for energy-efficient practices. This includes the ability to convey complex technical information in a clear and understandable manner to various audiences.
- Continuous learning and adaptability: Staying updated on the latest advancements in energy-efficient technologies, being adaptable to new innovations, and continuously learning about emerging trends in the field.

■ 5.3. CONTENTS

5.3.1. CONCEPTUAL CONTENTS

Knowing and understanding the following concepts and their importance for energy saving and consequently for society, environment and climate challenge, establishing relationships among them:

- Energy Savings, its benefits for society and individual.
- Energy Efficiency, its importance for a better society and future:
 - Methods.
 - Tools.
 - Economic benefit.
 - Environmental benefit.
- Energy labels, how it works and how they help improve energy savings and energy efficiency measurement.
 - Energy Audits.
 - Home appliances.
 - Home automation.
- Energy Markets
 - Taxes: Free market. Regulated market.
 - European Market.
 - Production and control of energy
- Impact in climate change.
- Future policies.

5.3.2 ATTITUDINAL CONTENTS

- Responsible consumption habits for improving energy saving (natural light, windows, and home appliances).
- Attitude of interest and curiosity towards topics related to energy saving and efficiency.

- Curiosity to investigate how daily choices affect the energy consumption.
- Willingness to work as a team and take positive initiatives to address environmental challenges.
- Collaboration and proactive adoption of practices that reduce the energy consumption (household appliances with lower energy consumption, using environmentally friendly vehicles, etc.).
- Group cooperation in carrying out and presenting tasks on the topic of energy saving and energy efficiency.
- Engaging in active citizenship activities.

5.3.3. PROCEDURAL CONTENTS

- Mobilization of knowledge acquired in the classroom by acting for a real change in the world.
- Implement concrete measures, such as the use of efficient lighting, adequate air conditioning systems, and effective management of energy resources.
- Use of technological tools to monitor energy consumption.
- Design and carry out task for improvement in school energy saving and efficiency.
- Sharing the knowledge acquired in a family environment and implement different improvements in their own home.
- Research and analysis of information obtained from different sources, develop a critical mind.

■ 5.4. EDUCATIONAL STRATEGIES

PRIMARY LEVEL

- Devising media news on energy efficiency.
- Educational videos or didactic presentations can be used to explain the energy efficiency concept and how energy labels are interpreted, in a didactic and entertaining way.
- Research about energy consumption at home. Find out how many electrical devices there are in students' homes, making a list and then selecting the most commonly used, trying to find out their power and energy efficiency by accessing the supplier's technical information and the energy labels.
- Debate about the area in which the highest energy consumption happens in an average family.
- Calculate the difference on power consumption between 2 electrical devices or household appliances similar but with different energy efficiency category.
- Research about energy saving technologies in different consumption areas:

lighting, transport, heating, domestic devices.

- Setting daily task to improve energy savings in different usual activities. Implementation of specific actions to save energy at home, on travel, when shopping, etc. (for example at least 4 specific actions at home with their families throughout the week) to learn and internalize simple habits that reduce energy consumption.
- Prepare a weekly diary with activities done in order to reduce energy consumption.
- Weekly classification associated with activities carried out related with improving energy savings or energy efficiency.
- Design a drawing contest related with energy efficiency and the importance of energy saving to reduce greenhouse gases emissions and Carbon footprint.
- Exhibition of resulting draws in which families and educational community will be invited and involved in voting to choose the winners.
- Dissemination campaign. The contest, the exhibition or even the rest of activities can be disseminated through the local media, for which a press release can be prepared; announcements on the center's website, invitations to parents' associations, companies, city hall or other organizations.

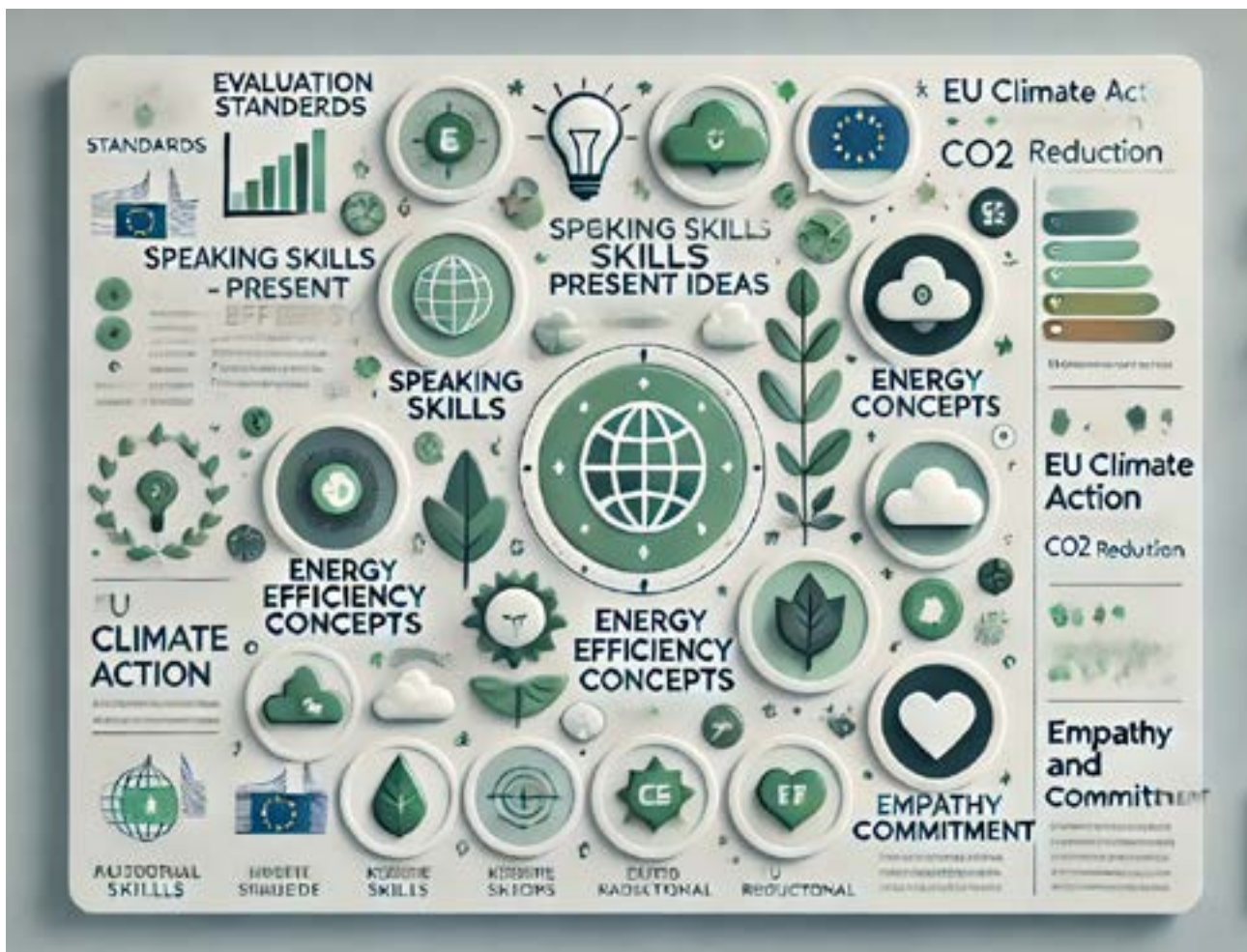
SECONDARY LEVEL

- Educational videos or didactic presentations can be used to explain the energy efficiency concept and how energy labels are interpreted in a didactic and entertaining way.
- Calculate the difference on power consumption between 2 electrical devices or household appliances similar but with different energy efficiency category.
- Round table about how to save energy at home in which the students' families are invited to participate, which will serve to share and reinforce good practices.
- Implementation of specific actions to save energy at home, on travel, when shopping, etc. They are asked to each carry out for example at least 4 specific actions at home with their families throughout the week to learn and internalize simple habits that reduce energy consumption.
- Debates on possible solutions and activities to reconcile economic growth with energy savings and energy efficiency.
- Design political measure to enhance the growth of energy efficiency in enterprises and homes.
- Oral presentation of the conclusions of the debate and the measures designed inviting educational community, parents' associations, companies, city hall and other authorities and social organizations.
- Participation in or development of solidarity campaigns to transform citizens into active participants.

- Dissemination campaign. The political measures designed, the participation on the campaigns or any of the results of the activities can be disseminated through social media, the media (for which a press release can be prepared), the educational center's website,

5.5. EVALUATION STANDARDS

- Speaking: ability to present orally (individually or in groups)
- Knowledge: understanding of the concepts and ability to relate different concepts and possible technologies and habits for energy efficiency.
- Understanding and valuing the European Union's cutting-edge work in implementing measures to improve energy savings and energy efficiency, and to reduce CO2 emissions.
- Attitudinal: interest and commitment to activities and group interaction, empathy towards the problems inherent to the topic.



MODULE 6. ENERGY EFFICIENT BUILDINGS

The primary objective of this module is to equip students with the knowledge and skills necessary to create buildings that are energy-efficient, environmentally sustainable, and economically viable. We will explore a range of strategies, technologies, and best practices that contribute to the design and construction of high-performance buildings.



Before we embark on this journey, let's understand why energy efficiency is a cornerstone of sustainable building practices. Buildings are significant consumers of energy, and their construction and operation have profound implications for the environment. By optimizing energy usage, we can reduce our carbon footprint, lower operational costs, and create healthier, more comfortable living and working spaces.

So it's really important to join all the technological resources we have to maximize energy efficiency, with new technology, new renewable energies, smart building, new insulator and some other tools.

Throughout the module, we will emphasize practical application. Real-world case studies, group projects, and hands-on activities will empower you to translate theoretical knowledge into actionable strategies for designing energy-efficient buildings.

■ 6.1. OBJECTIVES

- Understand energy efficiency concepts in the context of building design and construction and the importance of energy efficiency for sustainable and environmentally friendly buildings.
- Develop awareness related to the importance of the building envelope optimization: exploring strategies for optimizing the building envelope to minimize heat transfer and improve insulation and introducing materials and technologies that enhance the thermal performance of walls, roofs, and windows.
- Contribute to the integration of renewable energy sources such as solar panels, wind turbines, and geothermal systems in building design.
- Understand and analyze the benefits and challenges associated with integrating renewable energy into building infrastructure.
- Let know the smart building technologies (smart thermostats, energy-efficient lighting systems, and automated energy management) and the role of these technologies in enhancing energy efficiency.
- Let know the Energy-Efficient HVAC Systems: energy-efficient heating, ventilation, and air conditioning (HVAC) systems.
- Introduce the life cycle analysis as a tool to assess the environmental impact of building materials, construction methods, and energy systems.
- Demonstrate how life cycle analysis can inform decision-making for sustainable building practices.
- Teach Energy Auditing and Benchmarking: methods for conducting energy audits to identify areas for improvement in existing buildings.
- Inform about Energy Districts and how they are beneficial for energy saving and efficiency.

■ 6.2. COMPETENCES

- Technical competence: Understanding the technical aspects of energy efficiency devices, energy-efficient systems, and technologies. This involves knowledge of energy conservation measures and the ability to assess, recommend, and implement these technologies in various contexts.
- Analytical skills: Developing the ability to analyze energy consumption patterns, identify inefficiencies, and propose solutions to improve energy usage in different settings, such as households, industries, and commercial spaces
- Problem-Solving abilities: Developing the capacity to identify energy-related problems, think critically, and devise effective strategies to address energy inefficiencies.

- Knowledge of environmental impact: Understanding the environmental impact of energy usage, including carbon emissions, and the ability to analyze and compare different energy sources in terms of their ecological footprint.
- Regulatory awareness: Familiarity with energy policies, regulations, and incentives related to energy efficiency. This includes understanding how these policies influence decision-making in different sectors and being able to navigate legal frameworks.
- Interdisciplinary understanding: Appreciating the interdisciplinary nature of energy efficiency, combining knowledge from different aspects.
- Communication skills: Being able to effectively communicate and advocate for energy-efficient practices. This includes the ability to convey complex technical information in a clear and understandable manner to various audiences.
- Continuous learning and adaptability: Staying updated on the latest advancements in energy-efficient technologies, being adaptable to new innovations, and continuously learning about emerging trends in the field.

■ 6.3. CONTENTS

6.3.1. CONCEPTUAL CONTENTS

- Energy Efficiency concepts, its importance for a better society and future and their economic and environmental benefits.
 - Define the basic concepts of energy efficiency in the context of building design and construction.
 - Explain the importance of energy efficiency for sustainable and environmentally friendly buildings.
- Importance of the building envelope optimization:
 - Explore strategies for optimizing the building envelope to minimize heat transfer and improve insulation.
 - Introduce materials and technologies that enhance the thermal performance of walls, roofs, and windows.
- Advantages of the integration of Renewable Energy Sources and the Smart Building Technologies.
- Role of smart building technologies in enhancing energy efficiency (smart thermostats, energy-efficient lighting systems, and automated energy management).
- Energy-Efficient HVAC Systems such as energy-efficient heating, ventilation, and air conditioning (HVAC) systems.
- Life Cycle Analysis as a tool to assess the environmental impact of building materials, construction methods, and energy systems.
- Energy Auditing and Benchmarking: methods for conducting energy audits to identify areas for improvement in existing buildings.

- Definition and basics of energy districts and prove how energy districts are beneficial for energy saving and efficiency.

6.3.2. ATTITUDINAL CONTENTS

- Responsible consumption habits for improving energy efficiency (natural light, windows, home appliances).
- Reflective and critical attitude when evaluating decisions from an environmental perspective.
- Willingness to continually learn about sustainable practices and technologies.
- Reduced energy consumption (household appliances with lower energy consumption, using environmentally friendly vehicles).
- Group cooperation in carrying out and presenting tasks on the topic of energy saving and energy efficiency.
- Engaging in active citizenship activities.
- Awareness of the importance of the building envelope optimization, the integration of renewable energy sources into building infrastructure and the smart building technologies.

6.3.3. PROCEDURAL CONTENTS

- Mobilization of knowledge acquired in the classroom by acting for a real change in the world.
- Design and carry out task for improvement in everyday energy efficiency.
- Investigate the incorporation of renewable energy sources such as solar panels, wind turbines, and geothermal systems in building design.
- Demonstrate how life cycle analysis can inform decision-making for sustainable building practices.
- Analyze the benefits and challenges associated with integrating renewable energy into building infrastructure.
- Sharing the knowledge acquired in a family environment and implement different improvements in their own daily life.
- Research and analysis of information obtained from different sources, develop a critical mind.

■ 6.4. EDUCATIONAL STRATEGIES

PRIMARY LEVEL

- Introduction of the topic through news or advertising appeared in the media concerning to energy efficiency in building (provided by the teachers or found by students themselves). This way the students' opinions and previous knowledge can be explored.
- Educational visits to bioclimatic or energy-efficient buildings to learn about the different solutions used in situ.
- Design and build a small model of a building in which different energy efficiency measures are integrated (insulation, building orientation and windows, materials used, integration of renewable energies, etc.). Recycled materials can be used for the construction.
- Organize a contest and exhibition of the models built by the students highlighting the energy saving measures included, involving the educational community where possible.
- Research. Find out whether students' own houses have an energy certification. Find out why some do and some do not and what the legislation determines.
- Analyze some of the energy labels of the buildings that are found to have one or provide some examples to analyze the information collected.

SECONDARY LEVEL

- Brainstorming on possible solutions to improve insulation and take advantage of the sun energy and light in order to save energy.
- Present real-world case studies of successful energy-efficient building projects (bioclimatic buildings, high energy efficiency systems, passivhaus buildings).
- Visit to some of the real-world examples studied to know the solutions used in situ.
- Analyze best practices and lessons learned from exemplary buildings in terms of energy performance.
- Engage participants in a group project where they apply the knowledge gained to design an energy-efficient building. Encourage collaboration, critical thinking, and creativity in proposing sustainable solutions to save energy in buildings.
- Analysis of the life cycle of building materials, construction methods, and energy systems to assess the environmental impact in the different stages, from the extraction of raw material to the construction and use, considering the transport, manufacturing processes, etc.

- Oral presentations (supported by Power-Point, videos, Canvas, etc) to classmates, other groups or other members of the educational community on the activities carried out and the topics studied.
- Final debate on the importance of energy-efficient building in order to reduce emissions and carbon footprint for a Carbon neutral future.

■ 6.5. EVALUATION STANDARDS

- Speaking: ability to present orally (individually or in groups)
- Knowledge: understanding of the concepts and ability to relate different concepts, causes and possible solutions.
- Define the basic concepts of energy efficiency in the context of building design and construction.
- Explain the importance of energy efficiency for sustainable and environmentally friendly buildings
- Understanding and valuing the European Union’s cutting-edge work in implementing measures to improve energy savings and energy efficiency, and to reduce CO2 emissions.
- Attitudinal: interest and commitment to activities and group interaction, empathy towards the problems inherent to the topic.



MODULE 7. ENERGY EFFICIENT CITIES AND SUSTAINABLE MOBILITY



In this module, the focus shifts from the individual building to the broader urban landscape. We will investigate innovative approaches and technologies that foster sustainability, intelligence, and efficiency in urban mobility and city planning. As we navigate through these interconnected topics, students will gain insights into creating cities that are not only smart but also environmentally responsible and people-centric.

Urbanization is a global phenomenon, and as cities grow, so do the challenges associated with transportation, infrastructure, and environmental impact. This module addresses the need for comprehensive solutions to make urban areas more livable, efficient, and sustainable. We will explore concepts that integrate technology, environmental considerations, and social dynamics to shape the cities of tomorrow.

So is important to understand the principles of sustainable mobility and explore how intelligent technologies can enhance transportation efficiency while minimizing environmental impact, delve into the concept of Smart Cities, where data and technology are harnessed to improve infrastructure, services, and quality of life. Explore real-world examples and the potential impact on urban living, explore the shift towards electric vehicles (EVs) and other sustainable transportation modes. Learn about the benefits, challenges, and innovations in electric mobility, examine urban planning strategies that prioritize efficiency, sustainability, and the well-being of residents. Discover how thoughtful design can address issues such as traffic congestion, pollution, and resource consumption, investigate the role of collective transport systems, including buses, subways, and shared mobility services. Understand how these systems contribute to reducing individual car usage and improving overall urban mobility and explore the importance of bikeways and pedestrian-friendly infrastructure in creating accessible, healthy, and environmentally friendly urban spaces. Learn about design principles that prioritize non-motorized modes of transportation.

Once we know this concepts we will emphasize practical application through case studies, urban design simulations, and discussions on real-world challenges. You will gain the skills and knowledge needed to contribute to the development of sustainable, intelligent, and people-centric urban environments.



7.1. OBJECTIVES

- Raise awareness of the important benefits of the sustainable mobility, not only for the environment and climate challenge mitigation, but also for improving our live quality.
- Enable reflective and critical analysis of the consequences that our daily mobility actions have on the environment and which means of transport are the most polluting.
- Contribute to an individual or collective awareness of the need of bikeways and pedestrian-friendly infrastructures in order to promote a more sustainable mobility in the context of cities.
- Promote sustainable mobility habits consistent with the reduction of greenhouse gas emissions and the Carbon footprint.
- Reflect about the importance of the rational urban planning, zoning regulations and the design of accessible infrastructures and services in order to prevent the need of over-mobility by car.
- Make students aware of the importance of collective transport systems (including buses, subways, and shared mobility services) to prevent unnecessary gas emissions and pollution,
- Inform about the concept and examples of Smart Cities to understand the key services needed in a Smart City and their positive effects on the environment and climate change.

- Teach about the benefits, challenges and innovations in electric mobility and other transportation modes alternative to fuel vehicles.
- Equip students for the critical analysis of the benefits and challenges associated with the use of electrical vehicles in our society, as well as the subsequent contamination and carbon footprint reductions.
- Understand how collective transport systems and bikes contribute to reducing individual car usage and improving overall urban mobility.
- Encourage collaboration, critical thinking, and creativity in proposing sustainable solutions.

7.2. COMPETENCES

- Understanding the concept of Sustainable Mobility and the environmental, social, and economic impacts of transportation systems.
- Ability to evaluate and propose sustainable mobility solutions for urban areas.
- Smart City Literacy: understanding the concept of smart cities and their key components, familiarity with data-driven technologies and their applications in urban environments.
- Capability to analyze and discuss the implications of smart city initiatives on urban living.
- Knowledge of electric vehicle technologies and their environmental benefits, skill in assessing the infrastructure requirements for electric mobility adoption.
- Ability to analyze urban landscapes and identify areas for improvement and knowledge of zoning regulations, land use planning, and infrastructure design.
- Understanding the role of collective transport modes and public transportation systems, including buses, subways, and shared mobility services, in urban mobility.
- Understand how thoughtful urban designs can address issues such as traffic congestion, pollution, and resource consumption
- Commitment to the fight against climate change and active role in the use of sustainable transportation systems in accordance with own skills, aspirations, interests and values.
- Awareness on the importance of using bikes and walking along pedestrian-friendly paths as much as possible to prevent greenhouse gases emission.

■ 7.3. CONTENTS

7.3.1. CONCEPTUAL CONTENTS

Knowing and understanding the following concepts and their importance for society, environment and climate challenge, establishing relationships among them:

- Sustainable mobility:
 - Basic concepts of sustainable mobility in the context of cities.
- Smart Cities:
 - Concept and examples.
 - Tools and services needed in a Smart City.
- Electric Vehicles:
 - Basic of how do electric vehicles work.
 - Future, present and past.
 - Analyze the benefits and challenges associated with electrical vehicles in our society.
 - Contamination reduction and carbon footprint.
- Smart Building Technologies:
 - Examine the role of smart building technologies.
- Collective Transport
 - Tools for daily contribution to reduce CO2.
 - Importance of bikeways.
 - Improvement of live quality.
- Bikeway Design and Pedestrian-Friendly Infrastructure
 - Benefit and importance.
 - Urban design and planning.
- Direct impact of energy efficiency and sustainable mobility on CO2 reduction and fight against climate change.

7.3.2. ATTITUDINAL CONTENTS

- Attitude of reflection, curiosity and critical analysis of the environmental consequences of the excessive use of transportation means and its influence in climate change.
- Responsible use of transport and improvement of transport sustainability.
- Active commitment to reduce energy consumption by using environmentally friendly vehicles.

- Group cooperation in carrying out and presenting tasks on the topic of improvements in your city related to urban design.
- Engaging in active citizenship activities to improve mobility and sustainability.
- Mobilization of knowledge acquired in the classroom by acting for a real change in the world.
- Interest in the contribution of science and technology to a more sustainable mobility and smart and energy efficient cities as solution of the climate and environmental crisis.

7.3.3. PROCEDURAL CONTENTS

- Search, select, organize, contrast and analyze information from different reliable sources about the sustainable mobility as one of the solutions to the climate change.
- Present the information and data obtained using the format of texts, tables, small reports and digital tools.
- Cooperate and collaborate actively in the use of digital resources in a responsible, respectful, civic and ethical manner.
- Analyze concepts and data related to transportation, sustainable mobility and energy efficient cities, interpreting information in different formats (texts, models, graphs, maps, charts, tables, diagrams, schemes, websites...).
- Participate individually and/or cooperatively in the search, contrast and evaluation of proposals to face the problems of mobility in cities and the subsequent emissions of greenhouse gases; seek solutions and act for its resolution.
- Design and carry out task for improvement in urban design.
- Sharing the knowledge acquired in their family environment and implement different more sustainable mobility habits in their own daily life.
- Research and analysis of information obtained from different sources, develop a critical mind.
- Analyze the benefits and challenges associated with electrical vehicles in our society
- Make collective decisions, plan coordinated actions and solve problems about mobility and urban design by applying civic and democratic procedures and principles.
- Evaluate and promote sustainable transportation options, such as bus use, walking or cycling.
- Develop logistics plans that facilitate the adoption of greener transportation alternatives.

■ 7.4. EDUCATIONAL STRATEGIES

PRIMARY LEVEL

- Activity to reflect on what are our usual journeys (daily, weekly, yearly). List them individually and then reflect and discuss as a group on ways of making them more sustainable.
- Discussion: Do you know of any smart transport applications or systems that contribute to sustainable mobility? Why?
- Prepare a bulletin board where they post each time, they use collective transport.
- Weekly classification associated with activities carried out related with reducing conventional transport.
- Calculate the CO₂ reduction achieved by implementing different measures to eliminate individual car journeys in our daily commute (based on data and assumptions provided by the teacher).
- Draw a picture of their neighborhood or city center by introducing measures to promote sustainable mobility
- Devising, writing and sending articles to the media on how to improve sustainability in the mobility of the city.

SECONDARY LEVEL

- Look for news in the media related to measures implemented by cities to promote the use of public transport, electric vehicles, cycling, etc. Is there a consensus in the public opinion on these measures? Why?
- Find out what percentage of total energy consumption and greenhouse gas emissions are due to transport in our own country, in Europe and in the world.
- Do a practical study by taking data on types of transport and number of occupants in each of the vehicles in different parts of the city (by groups). Make graphs and draw conclusions on how mobility should be improved to make it more sustainable.
- Debates on possible solutions and activities to reconcile economic growth with energy efficiency.
- Engage participants in a group project where they apply the knowledge gained to design measures to improve urban design. Encourage collaboration, critical thinking, and creativity in proposing sustainable solutions.
- Calculate the CO₂ reduction achieved by implementing different measures to eliminate individual car journeys in our daily commute (based on data and assumptions provided by the teacher).
- Present real-world case studies of successful sustainable mobility.

- Analyze best practices and lessons learned from exemplary city designs.
- Urban design simulation. In groups, each group can work on a different neighborhood or urban area. Students design bikeways, pedestrian-friendly infrastructure and public transport lines to create accessible, healthy, and environmentally friendly urban spaces

7.5. EVALUATION STANDARDS

- Speaking: ability to present orally (individually or in groups)
- Knowledge: understanding of the concepts and ability to relate different concepts, causes and possible solutions.
- Understanding and valuing the European Union’s cutting-edge work in implementing measures to improve energy savings and energy efficiency, and to reduce CO2 emissions.
- Attitudinal: interest and commitment to activities and group interaction, empathy towards the problems inherent to the topic.



MODULE 8. CIRCULAR ECONOMY

This curriculum can adapt to different grade levels, helping students understand concepts related to Circular Economy. It will also teach them essential skills and attitudes for a better future.

Circular Economy is an economic model that aims to minimize waste and make the most of resources by reusing, repairing, recycling, and valorizing materials and products. It emphasizes the importance of sustainability, resource efficiency, and environmental responsibility throughout the product lifecycle.



This curriculum will explore the principles and practices of Circular Economy, focusing on waste reduction, resource optimization, eco-design, and the impact of raw materials.

Incorporating circular economy concepts into the primary and secondary school curricula is crucial for several compelling educational reasons. Firstly, it prepares students for the future by equipping them with the knowledge and skills needed to thrive in a world that increasingly values sustainability and resource efficiency. Understanding the principles of a circular economy helps students comprehend how to create sustainable systems that minimize environmental impact and promote economic resilience.

Secondly, teaching about the circular economy fosters environmental stewardship and social responsibility. Students learn about the environmental and economic challenges associated with traditional linear economies and the benefits of shifting towards more sustainable practices. This knowledge empowers students to adopt sustainable behaviors in their daily lives and to advocate for more sustainable practices within their communities, contributing to a climate-neutral and more sustainable future.

Moreover, integrating circular economy topics supports interdisciplinary learning. It connects subjects like science, technology, engineering, arts, mathematics (STEAM), economics, and social studies, providing a comprehensive understanding of how various systems interact within a sustainable framework. This holistic approach enhances critical thinking, problem-solving, and innovation skills, essential for addressing complex global challenges.

Additionally, the circular economy aligns with contemporary educational goals of fostering innovation and entrepreneurship. By learning about sustainable business models and circular design principles, students can develop innovative solutions to real-world problems, potentially leading to new economic opportunities and careers in green industries.

In conclusion, including circular economy topics in primary and secondary education is essential for preparing future generations to lead in a climate-neutral and sustainable world. It promotes environmental and social responsibility, supports interdisciplinary learning, and encourages innovation and economic resilience.

■ 8.1. OBJECTIVES

- Understand the concept of Circular Economy and its significance for a sustainable future.
- Teach students the basics of recycling and the impact of waste on the environment.
- Develop critical thinking and research skills while deepening understanding of circular economy principles.
- Develop waste reduction, resource management, and sustainable product design competencies.
- Cultivate attitudes of environmental responsibility, resource conservation, and sustainable living.
- Acquire practical skills for implementing Circular Economy principles.
- Foster innovation and problem-solving skills by applying circular economy concepts to real-world challenges.

■ 8.2. COMPETENCES

By the end of this curriculum, students should be able to:

- Explain the concept of Circular Economy and its importance.
- Identify and categorize different types of waste and their potential as resources.
- Analyze the environmental and economic benefits of reusing, repairing, and recycling products.
- Evaluate the impact of raw materials on environmental sustainability.
- Apply eco-design principles to minimize environmental impacts throughout a product's life cycle.
- Demonstrate the ability to design and implement circular solutions in real-life scenarios.
- Develop a sense of responsibility towards sustainable consumption and production.

■ 8.3. CONTENTS

8.3.1. CONCEPTUAL CONTENTS:

- Circular Economy principles and their significance.
- Types of waste and their potential for reintroduction into the economic circuit.
- The 5 R's of Circular Economy: Reuse, Repair, Recycling, Revalorization, and Reduction.
- The concept of the "Economy of Functionality."
- Eco-design and its integration into product development.
- The environmental impact of raw materials in various industries.

8.3.2. ATTITUDINAL CONTENTS:

- Environmental responsibility and ethics.
- Appreciation for the value of resources and waste reduction.
- Commitment to sustainable living and consumption.
- Empathy towards the impact of waste on the environment and future generations.
- Civic engagement and social responsibility (while applying circular economy principles to community improvement efforts).

8.3.3. PROCEDURAL CONTENTS:

- Practical skills for reusing and repairing products.
- Methods for recycling and upcycling materials.
- Strategies for eco-design and sustainable product development.
- Techniques for analysing the environmental footprint of products and materials.

■ 8.4. EDUCATIONAL STRATEGIES

PRIMARY LEVEL:

- Storytelling and interactive activities to introduce Circular Economy concepts.
- Circular Economy Fair: Organize a market of various second-hand products provided by the students, to learn the concept of reusing and giving value to products that can be used by others instead of turning them into waste. Depending on what they bring in, they are given "vouchers" to buy other products from the fair.
- Hands-on projects involving the 5 R's (Reuse, Repair, Recycling, Revalorization, and Reduction) of waste management.

- Recycling projects: Classroom recycling projects where students bring in recyclable materials from home and sort them into categories. Discuss the importance of recycling and how it helps reduce waste.
- Eco-Crafts: Create art projects using recycled materials such as paper, plastic, and fabric scraps. Students can make items like pencil holders, decorations, and toys.
- Recycling and upcycling Workshops: Workshops where students can bring in old items and create new, useful objects through upcycling. Discuss the importance of reducing waste and reusing materials.
- Composting demonstration: Set up a small composting bin in the classroom or school garden. Show students how to compost food scraps and garden waste.
- Sustainability Storytime: Read books and stories focused on sustainability and the environment. Follow up with discussions and activities related to the themes of the stories.
- Garden projects: Start a school garden where students can grow vegetables and flowers. Teach them about the lifecycle of plants and the importance of sustainable gardening practices.
- Field trips to recycling centres, repair shops, and sustainable businesses.
- Role-playing games to simulate Circular Economy decision-making.

SECONDARY LEVEL:

- In-depth case studies and discussions on Circular Economy success stories.
- Circular Economy Fair: Organize a market of various second-hand products provided by the students, to learn the concept of reusing and giving value to products that can be used by others instead of turning them into waste. Depending on what they bring in, they are given “vouchers” to buy other products from the fair.
- Circular Economy Research Projects: Assign students research projects on various aspects of the circular economy, such as renewable energy, sustainable manufacturing, and waste management. Students can present their findings to the class.
- Research assignments on the environmental impact of specific raw materials and industries.
- Design Thinking Workshops: Workshops where students use design thinking to create sustainable products or solutions to reduce waste. They can prototype their ideas and present them to their peers.
- Field Trips to Recycling Plants or Sustainable Businesses: Organize visits to local recycling facilities, composting sites, or businesses that practice sustainable manufacturing. Follow up with reflection activities or reports.

- Sustainability debates on topics related to the circular economy, such as the pros and cons of different waste management strategies or the role of government policies in promoting sustainability.
- Collaborative projects for designing and implementing circular solutions in local communities. Encourage students to develop and participate in community projects (using the Service-Learning method) focused on sustainability, such as organizing local clean-up events, setting up community gardens, or running recycling drives.
- Guest lectures from experts in Circular Economy and sustainable design.

■ 8.5. EVALUATION STANDARDS

Assessment will be based on a combination of:

1. Written assignments and exams assessing understanding of conceptual contents.
2. Practical projects evaluating procedural contents and problem-solving skills.
3. Group discussions and presentations assessing attitudinal contents.
4. Continuous assessment of participation and engagement in Circular Economy activities and initiatives.
5. Final projects demonstrating the application of Circular Economy principles in real-world contexts.



MODULE 9. BIOECONOMY AND GREEN ECONOMY



9.1. OBJECTIVES

- To understand the fundamental concepts of bio-economy, green economy, and sustainability.
- To promote responsible resource management and the preservation of natural resources.
- To emphasize the importance of conserving forests, biodiversity, and underwater life.
- To explore the “Farm to Fork” strategy and its role in promoting a healthy food system.
- To develop critical thinking skills and an awareness of environmental and economic issues.
- To foster a sense of responsibility towards sustainable practices.
- To enhance public speaking, research, and critical thinking skills while engaging with contemporary environmental issues.



■ 9.2. COMPETENCES

- Environmental awareness and responsibility.
- Critical thinking and problem-solving.
- Interdisciplinary knowledge in biology, economics, and sustainability.
- Communication and collaboration skills.
- Ethical decision-making and responsible citizenship.

■ 9.3. CONTENTS

9.3.1. CONCEPTUAL CONTENTS:

- Introduction to bioeconomy, green economy and sustainability.
- Basics of ecosystems and the importance of biodiversity.
- Study of ecosystems and their services
- Sustainable use of natural resources.
- Conservation of forests and their role in carbon sequestration.
- The 14th and 15th SDGs and their significance.
- Introduction to agriculture and its connection to food systems.

- Sustainable agriculture and the “Farm to Fork” strategy.
- Conservation strategies and policies
- Economic aspects of sustainability.
- Environmental ethics and responsible consumption.

9.3.2. ATTITUDINAL CONTENTS:

- Appreciation for nature and its value.
- Responsibility towards conserving natural resources.
- Respect for biodiversity and different life forms.
- Empathy for global challenges related to sustainability.
- Valuing locally sourced and healthy food.
- Deepened commitment to environmental conservation.
- Advocacy for responsible resource management.
- Ethical considerations in decision-making.
- Critical thinking towards economic systems.

9.3.3. PROCEDURAL CONTENTS:

- Observation and documentation of local ecosystems.
- Simple gardening and conservation activities.
- Discussions on current environmental issues.
- Group projects related to sustainable practices.
- Experiments related to agriculture and food systems.
- Research projects on biodiversity and conservation.
- Simulation of sustainable agricultural practices.
- Debates on economic policies and sustainability.
- Developing sustainable business models of bioeconomy and green economy.

■ 9.4. EDUCATIONAL STRATEGIES

PRIMARY LEVEL

- Eco-friendly gardening: Start a classroom or school garden using organic and sustainable practices. Teach students about composting, water conservation, and the benefits of growing their own food. Thanks to this hands-on experience with sustainable agriculture some basic concepts of the bioeconomy can be introduced.
- Environmental Storytime and discussions: Read books and stories focused on the environment, sustainability, and green practices. Follow up with discussions and creative activities like drawing or writing about what they learned.
- Field Trips: Visits to local green economy business on green economy or sustainable farms. Engage students in sustainable practices and activities like observing wildlife, and learning about local ecosystems.
- Field trip reports.
- Storytelling and case studies.
- Interactive and hands-on activities.
- Group discussions and debates.
- Collaborative projects with local communities.

SECONDARY LEVEL

- Sustainable business case studies: Provide real-world examples of sustainable business practices and encourage critical thinking through the analysis of case studies of companies that successfully implement green economy and bioeconomy practices. Discuss their strategies, challenges, and impacts on the environment and economy.
- Critical analysis of case studies.
- Debates on environmental policies: Debates on current environmental policies and issues related to the green economy and bioeconomy. Topics could include sustainable agriculture practices, renewable energy mandates or conservation efforts.
- Internships or volunteering in conservation organisations.
- Discussions on global environmental agreements.
- Field Trips: Visits to local green economy business on green economy or sustainable farms. Engage students in sustainable practices and activities like observing wildlife, and learning about local ecosystems.
- Environmental impact assessments: Students conduct environmental impact assessments for local projects or hypothetical scenarios. They can evaluate factors like carbon footprint, resource use, and ecological impact.

- Role-playing on bioeconomy or green economy projects with positions in favour and against. This way students learn how to assess environmental impacts and the importance of considering sustainability in planning and development.
- Community sustainability projects: Encourage students to develop and implement collaborative sustainability projects in their community to promote civic engagement and practical application of green economy and bioeconomy principles to create positive environmental change.
- Guest speakers and experts in the field.
- Project-based learning and practical experiments.
- Reflection journals.
- Presentations and communication campaigns about what they have learned.

■ 9.5. EVALUATION STANDARDS

Assessment will be based on a combination of:

- Written exams and quizzes.
- Project-based assessments.
- Class participation and discussions.
- Research papers and presentations.
- Reflection journals.
- Field trip reports.
- Peer evaluations and group work assessments.

MODULE 10. THE CARBON FOOTPRINT

In the face of growing concerns about climate change and environmental sustainability, European schools must embrace the transformative mission of becoming beacons of carbon neutrality and sustainability.

To achieve this, it's crucial to understand the concept of carbon footprint and the impact being generated, whether at an individual or organizational level in terms of emissions. The carbon footprint serves as an environmental indicator striving to encompass "the entirety of greenhouse gases (GHG) emitted through direct or indirect effects".

The pursuit of carbon neutrality and sustainability demands a comprehensive approach aimed at reducing greenhouse gas emissions on various fronts, including energy consumption, transportation, and waste management.



Image source: <https://science.howstuffworks.com/environmental/green-science/carbon-footprint.htm>

Yet, schools aspire to be more than only eco-friendly institutions; they also seek to be powerful engines of change by actively educating students and the community about the critical importance of sustainability and climate action. Through a combination of innovative practices and an integrated curriculum, European schools are poised to lead the way in fostering a culture of environmental responsibility and sustainable living that will resonate far beyond their classrooms.

■ 10.1. OBJECTIVES

- To contribute to a dual mission of achieving carbon neutrality in European schools and leading collective efforts to reduce greenhouse gas emissions
- To educate on sustainable lifestyles both within and beyond the school environment, cultivating both knowledge and climate action among students and the wider community.
- To raise awareness of Carbon Footprint calculation complexity in various spheres.
- To explain in an accessible manner the carbon footprint calculation process and its implications.
- To highlight International tools for Carbon Footprint measurement and attainment of Neutrality.
- To build capacity for critical analysis of Carbon Footprint, individually and organizationally.
- To train to be able to analyze and interpret which are the areas of human activity that contribute the most to our Carbon Footprint as a previous step to be able to correct it.
- To create awareness of severe ecological and environmental consequences of the Carbon Footprint.
- To raise awareness of the need for Individual and collective contribution to decrease this Carbon Footprint, striving for neutrality.
- To foster research and implementation of technological solutions that reduce the carbon footprint and enhance energy efficiency.
- To stimulate students' ability to critically analyze environmental problems.

■ 10.2. COMPETENCES

- Understanding the importance of sustainability and environmental responsibility in everyday life.
- Understanding the concept of Carbon Footprint and its global impact on the environment.
- Analyzing the causes, consequences and possible solutions to reduce the personal carbon footprint.
- Capacity to analyze and interpret which are the areas of human activity that contribute the most to our Carbon Footprint as a previous step to be able to correct it.
- Recognizing the importance of working towards carbon emissions neutrality.
- Development and encourage individual environmental awareness and responsibility.

- Contributing to the social change necessary to address environmental challenges.
- Reflecting on the environmental, social and economic consequences of not facing the results of a high carbon footprint.
- Becoming familiar with the various sustainable transportation options and reduce the use of transportation that uses fossil fuels.
- Active participation in waste reduction and management in all aspects of daily life.
- Developing skills to propose creative and sustainable solutions to a high carbon footprint.
- Actively contributing to reducing the carbon footprint, both individually and collectively.
- Encouraging participation in projects and activities that promote sustainability, both inside and outside the educational field.
- Leadership to positively influence the adoption of sustainable practices in the community.
- Continuously evaluating and adjust strategies to reduce the carbon footprint, based on the evolution of environmental awareness and technological advances.

■ 10.3. CONTENTS

10.3.1. CONCEPTUAL CONTENTS

- Defining the carbon footprint concept and its components.
- Identifying human activities that contribute significantly to the carbon footprint.
- Understanding the environmental, economic and social repercussions of a high carbon footprint.
- Exploring the impact on climate change, sea level rise, ocean acidification and biodiversity loss.
- Understanding the implications for the economic stability, productivity and well-being of communities.
- Knowing technologies and practices to improve energy efficiency and reduce Carbon Footprint in various contexts.
- Exploring waste reduction and recycling methods as strategies to reduce the carbon footprint.
- Understanding how energy choices affect our Carbon Footprint and the implications in its reduction and in daily life of the use of renewable energy sources.

- Understanding the impact of human actions on the generation of the carbon footprint.
- Analyzing the repercussions on the health, safety and well-being of people.
- Exploring the role of the carbon footprint in extreme weather events and other environmental challenges.

10.3.2. ATTITUDINAL CONTENTS

- Awareness among students of their role in protecting the environment, instilling the idea that each individual has a crucial role in reducing the Carbon Footprint.
- Respect for the importance of reducing carbon emissions.
- Attitude of interest and curiosity towards topics related to sustainability.
- Curiosity to investigate how daily choices affect the carbon footprint.
- Collaboration and proactive adoption of practices that reduce the carbon footprint.
- Reflective and critical attitude when evaluating decisions from an environmental perspective.
- Willingness to continually learn about sustainable practices and technologies.
- Empathy towards the natural environment and communities affected by climate change.
- Attitude of social responsibility, recognizing the broader impact of individual actions.
- Creative attitude that motivates the search for innovative and sustainable solutions.
- Commitment to reducing Carbon footprint and playing an active role based on personal skills, aspirations, interests and values.

10.3.3. PROCEDURAL CONTENTS

- Identify opportunities to reduce the Carbon footprint in daily activities and at school.
- Establish systems to reduce the consumption of disposable materials at school, to effectively recycle and proper waste separation as a way of reducing Carbon footprint.
- Use digital and technological resources to offer interactive and effective environmental education.
- Use tools and methodologies to measure the carbon footprint, understanding how to calculate emissions associated with various activities.

- Establish practices for ongoing monitoring of the school's carbon footprint, which involves collecting data and evaluating progress over time.
- Develop skills to interpret the results and propose improvement strategies based on the information obtained.
- Implement concrete actions to reduce carbon emissions, such as awareness campaigns, improvements in energy efficiency or carbon offset initiatives.

■ 10.4. EDUCATIONAL STRATEGIES

PRIMARY LEVEL:

- Visits to local businesses that have adopted sustainable practices and have low carbon emissions provides students with practical examples and the opportunity to converse with professionals committed to sustainability.
- Individual projects where students explain, through texts and/or drawings, what the carbon footprint entails, factors contributing to its increase, alternative transportation to reduce its impact, and the design of plans and routes for shared transportation or biking/walking to school. Subsequent idea exchanges will also enable them to begin reflecting on the issue.
- Educational videos or presentations will be used to explain key concepts and issues related to the carbon footprint in a didactic and engaging manner.
- Online resources, such as educational games, will be utilized as part of the learning experience, e.g.: EcoKids: This is an interactive website that has a variety of games and activities for kids to learn about the environment and sustainability. One of the games is called “Carbon Footprint Calculator” where you can calculate your carbon footprint and learn how to reduce it. <https://ecokids.net/es/>. The Carbon Cycle Game: This is a game created by the University of Michigan. It teaches kids about the carbon cycle and how it affects the environment.
<https://www.climate.gov/teaching/resources/the-carbon-cycle-game-36427/>
- Generate debate in class about the carbon footprint and how to reduce it.
- Initiatives on waste collection and consumption will be undertaken within the school. The significant amount of waste generated per inhabitant each year is highlighted, emphasizing the considerable and unavoidable waste of raw materials and energy. Additionally, waste will be repurposed to create scientific materials, artistic objects, or decorations.
- Exhibitions on pollution and carbon footprint, along with proposals to remedy them, will be set up.
- “Reduce Your Footprint” Contest: After exploring the topic, a contest of ideas will be proposed—encouraging the most original yet realistic proposals on how to reduce our carbon footprint individually and collectively (school, neighborhood, town, etc.). This way we can encourage community participation, involving students, school staff, and families in concrete actions to reduce the carbon footprint.

- Organize competitions between groups of students to see who can reduce their carbon footprint the most during a specific period. This initiative aims to promote creativity and teamwork among students while fostering a sense of competition in reducing carbon footprints.

SECONDARY LEVEL:

- Introduction to the topic through the search for recent news related to the carbon footprint and debate on this subject.
- Informative sessions and tutorials on simple tools for Carbon Footprint calculation, promoting their effective use for measuring and managing the Carbon Footprint.
- Organize activities that emphasize the connections between the Carbon Footprint and ecological impacts, fostering a deep understanding of the importance of climate action.
- Mapping the Carbon Footprint. How many planets would we need to live? How many to maintain our standard of living? How many planets would be necessary in different regions of the world? Observe the relationship between global development and the carbon footprint.
- Simulation games on the carbon footprint. In these games, students take on specific roles represented by cards and immerse themselves in situations related to environmental issues. Through simulated debates, decision-making, and problem-solving, students explore various aspects and perspectives of a topic. This approach not only facilitates the understanding of complex concepts but also fosters skills such as critical thinking, collaboration, and decision-making. Examples include The Spring Green Highway Game (conceived by Stephan Joseph and Nick Lester), Autopista (Walford, 1973), The Highway Game (Martini, 1980).
- Role-playing games engage students in interactive and enjoyable learning about environmental topics. They have cards with decisions about environmental actions and use dice to determine outcomes. Players face challenges based on their choices and the luck of the dice throw, allowing them to understand the consequences of their actions and develop critical and strategic skills to address environmental issues. These games encourage active participation and experiential learning, providing a dynamic and practical way to understand and reflect on environmental issues. Examples include The Poverty Game or The Caribbean Fisherman, addressing themes such as natural resource limitations, health, and natural disasters.
- Organize competitions between groups of students to see who can reduce their carbon footprint the most during a specific period. This can foster creativity and teamwork.

- Provide Guidelines for Achieving Carbon Neutrality in diverse settings: Develop specific guides tailored to different environments, offering clear guidelines for achieving carbon neutrality.
- Organize awareness campaigns in the community where students share information about the carbon footprint and provide practical tips to reduce it. This may include distributing pamphlets, organizing community talks, or creating content on social media.
- Collaborate with local environmental organizations for joint projects to decrease the Carbon Footprint of the town.

■ 10.5. EVALUATION STANDARDS

- Knowledge: understanding of the Carbon footprint concept.
- Understanding how energy choices affect our Carbon Footprint and the implications in its reduction and in daily life of the use of renewable energy sources.
- Understanding the impact of human actions on the generation of the carbon footprint.
- Knowing technologies and practices to reduce Carbon Footprint in various contexts.
- Attitudinal: interest and commitment to activities and group interaction, empathy towards the problems inherent to the topic.
- Attitudinal: awareness of the need to contribute individually and collectively to the solutions that need to be implemented to prevent, mitigate and adapt to the climate crisis.
- Collaboration and proactive adoption of practices that reduce the carbon footprint.
- Reflective and critical attitude when evaluating decisions from an environmental perspective.



Personal contribution as
citizens and consumers

MODULE 11. SUSTAINABLE, FAIR AND RESPONSIBLE CONSUMPTION AND LIFESTYLE



The solutions to mitigate climate change do not depend only on decisions, agreements and plans made by governments and institutions or on technological advances, but also fundamentally depend on changing the modes of production, consumption habits and lifestyles that dominate the most advanced societies.

A forceful and effective response to the challenge of climate change requires a social change that reduces dependence on fossil fuels and questions the consumerist and development models that advocate unlimited growth.

It is precisely in these last aspects where the individual contribution as citizens and consumers is fundamental. Hence the importance of educating in sustainable lifestyles and consumption, and also fair consumption models, that is, taking into account the environmental consequences of our actions and ensuring the integral development of all peoples, with economic, social and environmental sustainability, respecting their idiosyncrasies, cultures, traditions and basic human rights.



Climate change is produced and expressed in our daily lives, and this is one of the main areas where we can think and act to mitigate it. Climate change occurs as a consequence of human activity to which we all contribute through individual actions and the relationships we maintain with other people, so in this Curriculum we propose the need for activities that encourage group discussion and debate which will lead students to feel part of the causes and also of the solutions.

In this last block of the Curriculum we seek to eliminate the boundaries between knowledge and responsible action, between what is known and daily habits and behaviors carried out in our homes, in transportation, at the time of purchase, etc.

■ 11.1. OBJECTIVES

- To train to contribute to the mitigation of climate change and the achievement of a more sustainable, just and peaceful world through students' daily consumption habits and lifestyles.
- To teach to value the importance of energy saving and a more responsible use of energy, directly or indirectly.
- To promote sustainable lifestyles consistent with environmental protection, climate change mitigation and sustainable use of natural resources.
- To enable reflective and critical analysis of the consequences that our daily actions have on the environment, contributing to an individual or collective awareness.
- To empower students to develop and implement creative individual and collective sustainable solutions to prevent, correct, mitigate and adapt to climate change.
- To raise awareness of the need to contribute individually to the solutions that need to be implemented to prevent, mitigate and adapt to the climate crisis.
- To inform about the different ways of efficient and responsible use of water and energy in our daily activities and their contribution to the reduction of greenhouse gases and therefore to improve the climate emergency situation.
- To raise awareness of the need for individual contribution to sustainable mobility, highlighting the pedestrian option as the most compatible with a healthy urban environment for people and environment, and its positive contribution to the fight against climate change.
- To promote individual and collective alternatives to modify our purchasing and consumption habits in general, and those associated with waste production in particular, encouraging reuse, repair and recycling as a way to reduce greenhouse gas emissions.
- To educate in sustainable and fair consumption styles that contribute to the integral development of all peoples, respecting their environments, idiosyncrasies, cultures and traditions as well as basic human rights.

■ 11.2. COMPETENCES

- Capacity and willingness to contribute to the mitigation of climate change and the achievement of a more sustainable, fair and peaceful world.
- Value the need to change consumption habits and daily lifestyles for lower consumption of energy, water and resources in general.
- Willingness to develop sustainable lifestyles consistent with the protection of the environment, the mitigation of climate change and the sustainable use of natural resources.
- Capacity for reflective and critical analysis of the consequences that our daily actions have on the environment, contributing to individual or collective consciousness.
- Development of individual and collective sustainable solutions to prevent, correct, mitigate and adapt to climate change.
- Awareness of the need to individually contribute to the solutions that need to be implemented to prevent, mitigate and adapt to the climate crisis.
- Knowledge and understanding of ways of efficient and responsible use of water and energy and how they contribute to the reduction of greenhouse gases and therefore to improve the climate emergency situation.
- Awareness of the need for individual contribution to a more sustainable mobility.
- Development of forms of purchasing and consumption in general, and associated with waste production in particular that encourage reuse, repair and recycling.
- Sensitivity and responsibility to the existing inequalities between different areas of the world and the need for comprehensive human development that respects the environment, idiosyncrasy and culture of all territories

■ 11.3. CONTENTS

11.3.1. CONCEPTUAL CONTENTS

- Knowing personal contributions to greenhouse gases emissions and consequently to climate change.
- Identifying everyday places and situations in which energy is consumed and reflecting on the behaviors and factors that lead us to often waste energy unnecessarily.
- Understanding the environmental implications and contribution to climate change associated not only with the use of energy but also with water and other consumer assets, behind whose production, transportation and use there is also a large energy consumption.

- Understanding the importance of the management and sustainable use of natural and energy resources, ensuring their availability for future generations.
- Identifying actions to combat climate change and forms of energy savings and energy efficiency applicable in different contexts: home, school, mobility and any other daily activities.
- Describing the relationships of interconnection and interdependence that exist between our lives and the environment through the analysis of the causes and consequences of the climate and environmental crisis and the associated eco-social problems.
- Knowing different solutions through which significant reductions in energy consumption can be achieved, without loss of comfort or quality of the services.
- Explaining the link between our individual habits, mobility, consumption and energy models with the emission of greenhouse gases (GHG).
- Knowing efficient technologies from an energy point of view and their contribution to reducing GHG emissions and environmental impact.
- Knowing correct ways to separate waste for recycling and the importance of doing it regularly, understanding the implication in improving the problem of climate change.
- Understanding the urgent need to reduce waste generation through lower consumption of packaging, reducing unnecessary purchases and repairing or reusing products and devices whenever possible.
- Identifying sustainable and fair purchasing styles that contribute to the comprehensive development of all countries, respecting human rights and the idiosyncrasy, culture and traditions of all communities.

11.3.2. ATTITUDINAL CONTENTS

- Commitment to the fight against climate change, recognizing the need to take action by contributing to reducing emissions as citizens and consumers.
- Interest in knowing and adopting responsible, healthy, sustainable and environmentally friendly behaviors and habits.
- Positive and proactive attitude towards saving habits and efficient use of water, energy and resources in general
- Reflective and critical attitude regarding the repercussions it has on the environment when purchasing and using any consumer item.
- Raising awareness about the need for a Carbon-neutral economy and lifestyle that involves the entire society.
- Sensitivity, respect and empathy towards other people and the conservation of the environment, developing an attitude of regard and care.

- Dialogue and collaborative attitude when changing the production models, consumption habits and dominant lifestyles in our society towards more sustainable ones.
- Awareness towards sustainable mobility and other small individual sacrifices in terms of more responsible purchasing and consumption habits.
- Awareness of the need to reduce waste generation through lower consumption of packaging, reducing unnecessary purchases and repairing or reusing consumer items whenever possible.
- Commitment to the adoption of more responsible, sustainable, healthy and respectful consumption habits.

11.3.3. PROCEDURAL CONTENTS

- Analysis of the daily actions carried out as citizens and their consequences on the environment, from the local to the global.
- Creative ideas and solutions to contribute to improving, mitigating and adapting to the climate alarm situation.
- Preparing proposals for actions that reflect commitments and behaviors in favor of sustainability.
- Conceiving and implementing personal or family projects or initiatives to reduce the GHG emissions.
- Explaining and communicating in a creative and collaborative way alternative sustainable consumption habits.
- Cooperating within a group project by performing a specific function, with respect and empathy.
- Communicating and disseminating research results, establishing relationships between the knowledge and information acquired, developing interpretive and explanatory summaries.
- Presenting the final result of a project, sharing and critically evaluating its development, the difficulties encountered, the progress made and the achievements.
- Designing artistic productions creatively using plastic arts or sound, visual or digital techniques.
- Taking collective decisions, planning coordinated actions and solving problems by applying civic, ethical and democratic procedures and principles for the participation in group activities.
- Design, exhibition and implementation of initiatives aimed at promoting an active commitment to common values, improving the environment and community service.
- Participating individually or cooperatively in the search, comparison and evaluation of action proposals to face the climate challenge

■ 11.4. EDUCATIONAL STRATEGIES

PRIMARY LEVEL:

- Debate “Imagine an entire day without electricity or fuel”. Reflect and discuss what our daily lives would be like without being able to use energy in our homes, when traveling, etc. and all the basic comforts and needs that we would have to give up, as a way of valuing the importance of energy in our daily lives.
- Challenge students to try to spend a few hours without using electricity at all (reaching a consensus on the duration and timing to try to do it all at once). The next day, return to the activity and comment on who was able to really put it into practice, how long they lasted, how they felt, if they realized that many of the things they gave up were dispensable, or even if they discovered things they should get used to usually do in order to save energy.
- Research about energy consumption at home. Find out how many electrical devices there are in students’ homes, making a list as exhaustive as possible. Then select the 10-12 most commonly used, trying to find out their power and energy efficiency by accessing the supplier’s technical information and the energy labels. With the teachers’ help, try to organize devices in groups by the average consumption, ordering them from highest to lowest, taking into account their powers but also the consumption times. Reach a conclusion about the area in which the highest energy consumption happens in an average home.
- Observing with students the electricity meter and how the use of electrical devices increases the figure on the electric meter for a better understanding of the cost of energy use.
- Separate to recycle. Practical activity of correct separation of recyclable residues and waste to be recycled. It involves each student bringing to school a bag with different types of waste and providing some others that are considered interesting to comment on (once cleaned so that they can be handled easily). Containers of different types will be organized (paper/cardboard, packaging, glass, organic and others) and we will practice how to separate them in our homes, what type of bag we should put them in, and other tips to ensure recycling more easily.
- Workshop of Recycling. Making toys, household goods or decorative objects with waste to understand the value of the materials that we usually throw away.
- Brainstorm about responsible consumption habits. Responsible consumption ideas will be individually noted and later shared in small groups to improve, complement or perfect the proposals. Subsequently, all the ideas are shown, writing down each one of them on a small piece of cardboard to later select the best among the entire class (for example, each participant marking the 3 best with a green sticker). You can also mark with a red sticker those that we do not agree with and then proceed to a final joint debate.

- Round table about how to save at home in which the students' families are invited to participate, which will serve to share and reinforce good practices at home (tips to save water, energy, food, products, etc.).
- Implementation of specific actions to save energy, or resources in general, at home, on travel, when shopping, etc. Involving students in saving will teach them to consume more responsibly. They are asked to each carry out for example at least 4 specific actions at home with their families throughout the week to learn and internalize simple habits that reduce our Carbon footprint.
- Informative campaign. Design and execute a campaign to communicate what they have learned to the rest of the educational community in an original and very expressive way using one or more artistic formats: murals with photographs and drawings; posters with your own designs, or even explanatory videos.

SECONDARY LEVEL

- Debate to identify previous ideas of students, by asking the group some questions related to the use of energy and its environmental repercussions (How does energy consumption influence climate change? In what ways can we save energy indirectly? What factors cause a person to consume more or less energy? What problems do we face when we want to save energy? Etc.)
- Research on energy consumption. Make estimated calculations of energy consumption and its emissions derived, associated with various daily activities such as the daily consumption of our television in "stand by"; the annual consumption of our fridge; the consumption of our daily trips to school by car; the CO₂ emissions associated with a hot shower, etc. In groups or individually, trying to contrast the data collected by different students. The calculation methods must be suggested or data provided by the teachers. Finally, a file on the average energy consumption at home, when traveling, etc. can be extracted.
- Analysing the complete cycle of different products chosen by the students (a notebook, a mobile phone, a can of Coca-Cola, jeans, bread...) to investigate about the indirect consumption of energy. Each group can work on one of the products by completing a sheet that includes from the moment of extraction of the raw materials which it is made, its transportation to the transformation centers, the manufacturing itself, its packaging and subsequent transportation...without forgetting the collection and treatment or recycling once it becomes waste after being used. It serves to reflect on how we can save energy and lower our carbon footprint also through responsible consumption and recycling waste.
- Research and debate on the energy consumption and impacts behind clothing consumption. Students must write down the countries where a certain number of items of clothing have been manufactured (each participant will verify this for a total of approximately 20 items). In class, verify which are the

most common countries and then do research on the geographical, economic and social situation of those countries. Afterwards, a debate will be held on the reasons why it is manufactured so far away and the impacts and energy consumption derived from the subsequent transportation of these items, as well as the waste generated after their use, reflecting on the true need or not of such a great consumption that we make of clothing or other consumer goods.

- De-carbonization projects. Start by introducing opportunities for change that exist to reduce consumption and emissions (change our lifestyles, change the technologies we use for more efficient or less polluting ones, use new energy sources, etc.). Some common ideas can be presented such as: lowering the thermostat that regulates the heating, eliminating the “phantom consumption” of appliances when they are off, etc. Students are then asked to develop their own decarbonization projects, adopting one or several specific measures to be implemented, preparing a document that includes questions such as: What are we going to change? When? Who will be involved? Is it going to cost us money or invest money? Will it bring us economic savings? What results do we expect? How are we going to evaluate achievements? Finally, the individual or group plans will be presented to the rest of the classmates, with participants taking turns to ask questions or suggestions for improvement.
- Action for a C-neutral future. During an agreed period of time, students will implement their plan by applying the agreed measures and collect information on the results obtained. After the time defined to estimate the provisional results obtained, they will prepare a report evaluating the results achieved that they will finally present in the classroom. Furthermore, the results obtained can be communicated to the rest of the educational community using the format that each group chooses, as visual and artistic as possible: murals with photographs and drawings; brochures or posters with their own designs, or even videos.
- Create a blog with advice on how to save energy and efficiency and responsible consumption, to share and make known everything learned to the educational community, their families, friends... A format, a logo and messages will be chosen and jointly designed to encourage reflection, criticism and responsible consumption.
- Each student will choose some commitments to savings, energy efficiency and responsible consumption that they agree to put into practice (e.g. one at home, another when traveling and another when shopping). Periodically, discussions can be held in class about the degree of compliance and the interest in expanding the list of commitments by incorporating new habits that can have significant effects in the fight against the climate emergency.

11.5. EVALUATION STANDARDS

- Identifying everyday places and situations in which energy is consumed and reflecting on the behaviors and factors that lead us to often waste energy unnecessarily.
- Analysis of the daily actions carried out as citizens and their consequences on the environment, from the local to the global.
- Knowledge of actions to combat climate change and forms of energy savings and energy efficiency applicable in different contexts: home, school, mobility and any other daily activities.
- Positive and proactive attitude towards saving habits and efficient use of water, energy and resources in general
- Reflective and critical attitude regarding the repercussions on the environment when purchasing and using any consumer item.
- Commitment to the adoption of more responsible, sustainable, healthy and respectful consumption habits



MODULE 12. SUSTAINABLE AND RESPONSIBLE LEISURE AND TOURISM



Climate change is a consequence of human activity to which we all contribute through individual actions, consumption and our lifestyles, among which our leisure and tourism activities are important. Our decisions about where we stay, how we travel, what we eat, what activities we do on our trips and holidays influence the amount of gases emissions we generate, so it is important to educate and raise awareness for responsible and sustainable leisure.

But the concept of leisure is broader than tourism and includes all the activities we do in our free time, not only environmentally responsible travel or travel in natural environments such as ecotourism, agro-tourism or nature tourism.

Leisure is all those activities that allow human beings to distract themselves and place themselves mentally and physically in a different context, where they can develop their minds and acquire greater knowledge. It refers to the use of free time in a variety of ways that do not always involve expenditure or consumption, although they frequently do: tourism, gastronomy, the audiovisual sector, books, fashion, the plastic arts, nature, sport, culture, etc.

Closely linked to the productive sectors of tourism or the hotel and catering industries and to consumption, although in reality it is a more profound social phenomenon, which manifests itself through cultural, sporting, recreational and tourist activities.

The relationships between leisure and the United Nations Sustainable Development Goals (SDGs), which have become the Agenda 2030, are many and varied: environmental, due to its great impact on the environment; economic, as the tourism, cultural and creative industries and the economy of sport and recreational activities are very important in many European countries; and social, as it is a source of employment and enables values that bring us closer to human rights.

Sustainable tourism pursues respect for heritage and the natural environment, the appropriate use of energy and natural resources as well as seeking to contribute to creating stable employment, reducing poverty and mitigating the loss of cultural values. Tourism and leisure activities have great socio-cultural, environmental and economic importance and therefore they can contribute to social cohesion and reduce vulnerability and exclusion gaps.

Finally, an important part of our leisure activities are digital. We spend more and more time connected to the internet through different applications and games that are common hobbies nowadays. Although digitalization means a reduction in pollutant emissions when it involves a minimization of travel, we cannot lose sight of the fact that digital consumption also has a significant ecological impact, so the transition to a more digital world must also be made in a sustainable way.

Internet use and all the data we generate as we move online are stored in a physical place: data centers, which need enormous amounts of energy to function and not become overloaded. The digital servers and supercomputers that allow us to be constantly connected, run non-stop. There are many small habits we can change or be aware of to reduce our digital carbon footprint.

■ 12.1. OBJECTIVES

- To promote sustainable forms of leisure and tourism activities consistent with environmental protection, climate change mitigation and sustainable use of natural resources.
- To train to contribute to the mitigation of climate change and the achievement of a more sustainable, just and peaceful world through our habits during leisure and tourism activities.
- To train for the reflexive analysis of the carbon footprint of tourism, sports, cultural, entertainment and leisure activities and the choice and implementation of habits that contribute to preventing, correcting, mitigating and adapting to climate change.
- To educate in sustainable and responsible leisure styles that contribute to the integral development of all peoples, respecting their environments, idiosyncrasies, cultures and traditions.
- To familiarize students with the concept of sustainable tourism and the interdependence between economies, societies and territories.
- To raise awareness of the ecological and carbon footprint of digital leisure activities and the need to contribute individually to minimizing this impact.

■ 12.2. COMPETENCES

- Willingness to develop sustainable leisure and tourism styles consistent with environmental protection, climate change mitigation and sustainable use of natural resources.
- Ability to understand the implications of leisure and tourism on the environment and climate change.
- Ability to understand the implications of sustainable tourism in achieving a more sustainable world.
- Value the need to change consumption habits and leisure styles in order to consume less energy, water and resources in general.
- Capacity for reflective and critical analysis of the consequences that our online activity has on the environment.
- Development of individual and collective sustainable leisure activities to prevent, correct, mitigate and adapt to climate change.
- Knowledge and understanding of sustainable and responsible forms of leisure and tourism 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 sustainable tourism use.
- Respect for the environment, idiosyncrasy and culture of all territories.

■ 12. 3. CONTENTS

12. 3.1. CONCEPTUAL CONTENTS

- Understand the concept of sustainable and responsible tourism and understand its importance in the fight against climate change, environmental impact and loss of cultural values.
- Know the personal contribution to the carbon footprint behind tourism, recreation and leisure activities.
- Identify places and leisure situations where energy is consumed and reflect on the behaviours and other factors that lead us to waste energy unnecessarily.
- Understand the environmental implications and contribution to climate change behind our choice of transport, accommodation and other facilities in our travel and leisure activities.
- Understand the importance of sustainable management of tourism and leisure to secure these activities for the long term and for future generations.
- Identify actions to combat climate change, ways of saving and energy efficiency and sustainable habits applicable in tourism and leisure contexts in general.
- Identify different solutions through which we can achieve significant reductions in our Carbon footprint in leisure and tourism activities.

- Understand the importance of maintaining responsible consumption habits of water, energy and resources in general during our travels, including the reduction of waste generation through reduced consumption of packaging.
- Identify sustainable and fair purchasing styles that contribute to the integral development of all countries, respecting human rights and the idiosyncrasies, culture and traditions of all communities.
- Understand the potential contribution of sustainable tourism to mitigate the loss of cultural values, boost local economies and preserve natural environments.
- Know habits we can change or be aware of to reduce our digital carbon footprint.

12. 3.2. ATTITUDINAL CONTENTS

- Commitment to the fight against climate change and the reduction of emissions as tourists and leisure consumers.
- Interest in learning about and adopting responsible, healthy, sustainable and environmentally friendly behaviour during our trips and tourist activities.
- Positive and proactive attitude towards saving habits and efficient use of water, energy and resources in general in our leisure time.
- Reflective and critical attitude towards the repercussions that our tourism and leisure activities (including digital consumption) have on the environment.
- Awareness of the need for sustainable and carbon neutral tourism involving the whole of society.
- Sensitivity, respect and empathy towards local cultures, customs and traditions in our tourist visits.
- Dialogue and collaborative attitude when changing tourism and recreational habits incorporating sustainability issues, support for the local economy and commerce, respect for natural and cultural heritage and intercultural tolerance at the time of its choice and development.
- Commitment to the adoption of responsible, sustainable, healthy and respectful leisure and tourism habits.

12.3.3. PROCEDURAL CONTENTS

- Research the leisure activities people do and analyze their consequences on the environment and on climate change, from the local to the global.
- Calculate the carbon footprint behind the tourism and leisure activities we carry out.
- Generate ideas and proposals for enjoying tourism and leisure activities with a low contribution to the carbon footprint.

- Explain and communicate more sustainable alternative leisure habits to others in a creative and collaborative way.
- Cooperate within a group project playing a specific role, showing respect and empathy.
- Communicate and disseminate the results of research, establishing relationships between the knowledge and information acquired, and elaborating interpretative and explanatory syntheses.
- Make collective decisions, plan coordinated actions and solve problems applying civic, ethical and democratic procedures and principles for participation in group activities.
- Design, present and put into practice initiatives aimed at promoting an active commitment to common values, the improvement of the environment and service to the community.
- Participate individually and/or cooperatively in the search for, contrast and evaluation of proposals for action to face the climate challenge.

■ 12.4. EDUCATIONAL STRATEGIES

PRIMARY LEVEL:

- Brainstorming on what are the favourite or usual leisure and tourism activities of the group of students. Reflection on their impact on the environment and climate change.
- Introductory activity on the concept of sustainable tourism. In order to introduce the topic and to find out the previous ideas that the students have about this concept, participants can explain, using texts and/or drawings, what sustainable tourism consists of. The subsequent sharing of ideas will allow them to begin to explore the topic in greater depth.
- Watch presentations, videos or documentaries to gain a more complete understanding of all the aspects included in the concept of sustainable leisure/tourism. Preferably videos or presentations that explain it in an entertaining visual way and motivate reflection.
- List of sustainability measures (in terms of water consumption, energy, products, waste collection and recycling, etc.) that are common in catering and accommodation establishments based on the students' personal experience.
- Search for and analyze advertising campaigns for travel, accommodation or tourism activities that highlight sustainability aspects, carbon neutrality, carbon footprint offsetting, etc.
- Elaboration of murals. Checking the 2030 Sustainable Development Goals to which sustainable tourism activities contribute. Produce an explanatory mural for each of the SDGs considered to be covered by this style of tourism, explaining the reasons or giving examples.

- Brainstorming and group discussion on alternative and more sustainable forms of leisure activities. Ideas are written down individually and then shared in small groups to improve or complement the proposals. Afterwards, all the ideas are displayed on a small piece of cardboard and finally the best ones are selected from the whole class (e.g. each participant marks the 3 best ones with a green sticker to choose the best ones). You can also mark with a red sticker the ones you do not agree with and then proceed to a final joint debate.
- Reflection and debate on whether our well-being would increase in different situations such as: having greater access to or spending more time in the countryside and green spaces; if we spent less time in front of the television, computer or video games and more time shared with the family or in civic participation; if we aspired to have fewer material things and learned to enjoy simple things. Organize groups for each discussion topic with half the group in favour and half against, having to find arguments to defend that position, regardless of their personal opinion.
- Produce a handbook of good practices to reduce the ecological and carbon footprint of tourism activities.
- Creative activities. Drawing pictures representing sustainable leisure activities, their advantages and lower impacts.

SECONDARY LEVEL:

- Brainstorming on what are the usual leisure and tourism activities of the group of students. Reflection on what impact they have on the environment and climate change.
- Discussion on how we could use our free time in more meaningful ways that are not so focused on consumption and economic activity and the advantages and disadvantages this would have.
- Talk about the concept of sustainable tourism and all the aspects it includes, given by some expert person related to the sector, if possible from the community (a father, mother or relative of a student, a technician or businessperson from the neighbourhood or village, etc.). Failing this, it can be given by the teaching staff.
- Research on the existing offer on the market of tourist activities or trips that are advertised as sustainable.
- List of sustainability measures (in terms of water consumption, energy, products, waste collection and recycling, etc.) that are common in catering and accommodation establishments based on the students' personal experience.
- Research on the carbon footprint of our online activity. Gathering information through the internet, asking possible experts in IT and digitization, etc.
- Make a report and an oral presentation on the findings of the above research and tips on how to reduce the impact.

- Challenge: spend a week without using a mobile phone. Discussion afterwards on how they felt, leisure activities they found as an alternative during that period, whether they shared more time with their friends and families, whether they plan to reduce the time they spend daily using their mobile phones, etc.
- Role play. Set up an imaginary situation in relation to tourist activities and their environmental and climate impact, in which there are different characters and positions that the students have to represent.
- Awareness-raising campaign on the importance of contributing to sustainability and lowering the carbon footprint through tourism and leisure activities. Posters, brochures, videos, etc. can be designed and involve the educational community and the school environment.
- Celebrate World Tourism Day by organizing activities to inform the community about the social, cultural and economic importance of tourism, as well as how the sector can contribute to achieving the Sustainable Development Goals.

■ 12.5. EVALUATION STANDARDS

- Attitudes and opinions expressed regarding the topic under study.
- Understand the concept of sustainable and responsible tourism and its importance.
- Know the personal contribution to the carbon footprint behind tourism, recreation and leisure activities.
- Understand the environmental implications and contribution to climate change behind our choice of transport, accommodation and other facilities in our travel and leisure activities.
- Reflective and critical attitude towards the repercussions that our tourism and leisure activities (including digital consumption) have on the environment.
- Awareness of the need for sustainable and carbon neutral tourism involving the whole of society.
- Exposition orally of the main ideas worked on, supported by presentations.
- Participation with good attitude and respect in the different tasks proposed.

MODULE 13. BALANCED AND SUSTAINABLE FOOD



What we eat not only affects our health but also the planet. Balanced and sustainable eating is that which provides all the necessary nutrients to be healthy and happy, while also respecting the environment and natural resources. In a world where food choices have such a direct impact on health and the environment, students need to acquire a strong understanding of balanced and sustainable eating.

Environmental awareness and informed decision-making should be encouraged in relation to the following key aspects:

- Food Labeling: Food labeling enables an understanding of the environmental and nutritional impact. Pupils should learn to read nutritional labels and understand different sustainability seals. Through this skill, students can make better decisions, selecting foods that not only benefit their health but also reduce their environmental footprint.
- Diets with low Environmental and Carbon Footprint: Certain dietary patterns can be more sustainable; it's important to incorporate more plant-based foods and reduce the consumption of animal products. This section not only promotes health but also introduces practical ways for students to contribute to the planet's sustainability through their daily dietary choices.
- Importance of local and bulk foods: Understanding the origin of foods and choosing local and bulk products not only supports the local economy but also reduces the environmental footprint associated with the transportation of foods over long distances. These everyday choices can make a significant difference, supporting sustainability and connecting students with their surroundings.

- NOVA Classification of Food Products and Processing Levels: The NOVA classification shows the degree of processing in consumed foods. Choosing less processed foods promotes health and reduces the energy and resources needed for food production. Students will learn to distinguish between minimally processed foods and those with high levels of processing, understanding the direct impact on sustainability and health.

This module of the Curriculum aims to provide primary and secondary level students not only with theoretical information but also with practical skills that enable them to be conscious consumers and advocates for balanced and sustainable eating in an ever-changing world.

While the general approach will remain the same for both primary and secondary level students, due to the age differences, the content will be tailored differently to cater for the different levels of understanding and attention span.

Seeing as children are not in control of their own diets, the point is not to change their habits but to implant them with the knowledge of these diets, so that in the future they can make informed choices when they have the option.

■ 13.1. OBJECTIVES

- Teach students about the current state of sustainability in the sector of Food and Nutrition and show them the importance of seeking sustainability in this sector.
- Provide detailed information on nutritional labels and sustainability certifications to enable students to make informed decisions about food products.
- Examine the need for food regulation, highlighting aspects relevant to sustainability.
- Explore the environmental and social impact of different types of food, production systems, growing methods and delivery methods.
- Analyze the pros and cons of various dietary options from nutritional, ecological, and ethical perspectives.
- Identify dietary patterns that reduce environmental and carbon footprints, encouraging the selection of more sustainable foods.
- Recognize the importance of choosing local and bulk foods, understanding their impact on sustainability, and reducing the environmental and Carbon footprints.



- Acquire knowledge about the NOVA classification of food products, understanding different processing levels and their impact on health and sustainability.
- Promote responsible, supportive, and critical consumption of foods.

■ 13.2. COMPETENCES

- Reading and identifying relevant information on food labels, interpret this information and discern the sustainability impact of the food bought.
- Analyzing the impact of distance and proximity of foodstuff on an individual and commercial level, including the importance of concepts such as Farm-to-Fork.
- Awareness of the importance of balanced, healthy and sustainable food consumption habits
- Identify and design specific diets with low environmental impact, as well as the specific metrics used to determine their environmental impact.
- Competence in the development of low environmental impact diets, understanding of the metrics used to measure the environmental impact of diets.
- Reading and interpreting the NOVA rating levels and understanding how this classification contributes to assessing the environmental impact of food.

■ 13.3. CONTENTS

13.3.1. CONCEPTUAL CONTENTS

- Recognizing information about macro and micronutrients on food labels and understanding the importance of macro and micronutrient content.
- Interpreting information about the proximity and degree of processing of foods, using conventional labels and the NOVA classification.
- Discovering how food processing affects nutritional quality and sustainability, according to the NOVA classification.
- Understanding the principles that make a diet sustainable and balanced.
- Familiarity with the Mediterranean, Nordic, Vegetarian, and Pescetarian diets.
- Understanding the risks of strict vegan diets due to scientific evidence suggesting their inappropriateness for children.
- Understanding the concepts of “Farm-to-Fork”, “zero-kilometer foods,” and locally sourced foods.
- Understanding the environmental impact of foods sourced from distant places compared to locally produced foods.
- Exploring in more detail how locally sourced and bulk foods contribute to nutritional value and sustainability.

13.3.2. ATTITUDINAL CONTENTS

- Development of a critical attitude towards the information on the labeling of food products.
- Encourage a critical attitude when analyzing nutritional and sustainable information on labels and understand the need to look for clear and complete information on food labels.
- Awareness about the social and ethical impact of various diets.
- Understand the importance of the role of the consumer and health professionals in good practices in the food industry.
- Development of a proactive attitude to promote changes in purchasing and eating habits.
- Commitment to promoting the use of locally sourced foods.
- Awareness about the importance of fresh and bulk foods to reduce environmental impact.
- Commitment to promoting eating habits that contribute to environmental sustainability.
- Promote awareness about the different levels of food processing and willingness to choose less processed foods for a healthier and more sustainable diet.

13.3.3. PROCEDURAL CONTENTS

- Analyze and understand nutritional information on food product labels.
- Interpret additional information on food labels, such as specific ingredients, allergens, and additives, to make more informed decisions.
- Recognize and understand the seals and labels that indicate sustainable and environmentally friendly practices.
- Plan and design diets that minimize the environmental and carbon footprint.
- Know how to compare between more or less sustainable alternatives to make more conscious decisions.
- Get into the practice of using reusable containers when purchasing food in bulk, promoting sustainable practices and reducing packaging waste.
- Learn to evaluate the freshness of food, to ensure nutritional quality and minimize food waste.
- Know how to apply the NOVA classification, differentiating between minimally processed and highly processed foods.

■ 13.4. EDUCATIONAL STRATEGIES

PRIMARY LEVEL:

For Primary level students, the curriculum will be designed using child-friendly imagery through the use of graphic design wherever possible. That way, children will be exposed to more familiar images and concepts, and they'll be able to listen to the content in a more appropriate way. Teaching will be assisted through PowerPoint presentations, food props and the use of stories. Education will be provided in small sessions.

The level of knowledge will also be tailored. Specifically, we will not focus on the details, but rather the general method. Referring back to the contents for example, emphasis will be given on understanding the importance of “knowing what we eat” by looking at the labels on the back of a food. We don't expect children to be familiar with the contents themselves, but rather we want to implant them with a habit that they will become more familiar with in the future, and one that they can also influence their parents towards.

- Story-telling about specific diets based on characters designed to represent each diet to make them more appealing. Instead of explaining the scientific background of these diets, we will aim to create a story with these characters, who follow these diets, and who will explain what these diets look like and how they help them. Again, we won't focus on scientific facts, but rather simple concepts such as “stronger”, “healthier”, “better for the environment” – concepts that are easily memorized and comprehended.
- Label Detectives: Students can bring food packaging from home and, in groups, identify and discuss the nutritional and environmental information on the labels. Investigate the origin, composition and labeling of some foods that are commonly consumed. Subsequently, they will prepare a report that summarizes and analyzes the information collected, thus promoting awareness of informed and sustainable eating habits.
- Interactive game. Food props will be placed around the class and children will be divided into groups. Each group will be assigned a diet and they will have to locate the 3 appropriate foods for that diet. The caveat will be that they will need to do so with the least amount of steps, so they can focus on local foods.
- Let's go to the market (in class). Awareness of sustainable and balanced eating practices is promoted among students by simulating a market with toy foods, with labels of the different food products (dummy labels on each toy food or box of products with nutritional and sustainable information such as carbon footprint, place of origin, etc. and toy bills to carry out a complete practice.
- Design your food label. Each student will draw the label they would like the food to carry in order to identify the best nutritional and sustainable option.
- Talk about the degree of food processing. Explaining processing and additives to children in detail may be counterproductive, but explaining how processing can be harmful should be simple. With the help of imagery, children will be taught that as food get more and more processed, it produces more and more CO₂, uses more water and energy, which are all bad for the environment.

- Sorting food products: Students (individually or in teams) will compete by ordering different food products according to the NOVA classification (from lowest to highest degree of processing), where they will try to be as precise and fast as possible.

SECONDARY LEVEL:

Secondary level students have more knowledge and comprehension capacity, and due to their early adolescent stage may not be receptive to more juvenile methods such as avatars and stories. For this group, we will focus on their existing and emerging environmental concerns. The educational material will still include PowerPoint presentations but no storyboards.

- Take a short questionnaire about personal and family eating habits, and reflect on how to improve them.
- Interactive learning about food labels. A professional will explain the meaning of each content, and then the students will have to identify the healthiest between sets of two products. The point of this exercise will be for students to understand the actual differences of contents and let go of preconceived notions. The students will be provided with two labels, one with high Carbohydrate content but low sugar, and one with lower Carbohydrate content, but high sugar. They will then be asked to pick the healthiest one.
- Label Analysis: Students can bring food packaging from home and, in groups, identify and discuss the nutritional and environmental information on the labels. Investigate the origin, composition and labeling of some foods that are commonly consumed. Subsequently, they will prepare a report that summarizes and analyzes the information collected, thus promoting awareness of informed and sustainable eating habits. They will discuss how purchasing decisions impact sustainability.
- Talk about specific diets. We will try to mix health and cosmetic interest with environmental ones. As adolescents, many students will have emerging interest in these subjects, so we will try to present each diet, this time by name, both in terms of their effects on the body, as well as their effects on the environment. Practical instructions on how to follow these diets, as well as their benefits and risks will be provided.
- Design of a Healthy and Sustainable Diet. Students will be tasked with designing one day's worth of meal plan for each diet, based on what they have learned (balanced and sustainable diet). They will design a daily menu that promotes personal health and contributes to environmental sustainability, encouraging conscious decision-making in food choices.
- Food Journey: mapping activity to follow the route of food from the place of production to the table. The travel impact of different local foods versus products that come from far away will be compared and discussed.

- Responsible purchasing simulation: A supermarket is simulated in the classroom where students receive fictitious budgets and must make purchases considering sustainability.
- Visit a local market or organic farm, and interview producers or sellers about their practices and/or products.
- Project about local food to promote the importance of these foods and their positive impact.
- Design your food label contest. Each student will create the label that the food should have in order to identify the best nutritional and sustainable option.
- Research into Sustainable Diets: Students research low environmental footprint diets in groups (each group a different diet) and then present it to the rest of the class.
- Sorting food products: Students (individually or in teams) will compete by ordering different food products according to the NOVA classification (from lowest to highest degree of processing), where they will try to be as precise and fast as possible.
- Role playing. Debate on ultra-processed and those that are not: A debate is organized about these foods and their relationship with health and the environment. Students investigate and defend different perspectives.
- Creation of Infographics: Students create infographics about the NOVA classification. They highlight examples of foods in each category and their impacts.

■ 13.5. EVALUATION STANDARDS

- Attitudes and opinions expressed regarding the topic under study.
- Identification and explanation of the benefits, risks and impacts of using different types of food, production systems, growing methods and delivery methods.
- Analyze the pros and cons of various dietary options from nutritional, ecological, and ethical perspectives.
- Interpret and understand nutritional information on food product labels and the additional information included on them to make more informed decisions.
- Recognize and understand the seals and labels that indicate sustainable and environmentally friendly practices.
- Use of strategies to carry out individual and team work, showing skills for the peaceful resolution of conflicts.
- Exposition orally of the main ideas worked on, supported by the presentations made.
- Participation with good attitude and respect in the different tasks proposed.
- Proactive attitude to promote changes in purchasing and eating habits.

MODULE 14. CARBON NEUTRAL SCHOOLS.

The objective of achieving “Carbon neutral schools”, that is, achieving that the activities carried out at the school do not have a net impact on the climate due to greenhouse gas emissions, it’s really ambitious and, at the moment, it is not fully within the reach of most of schools.

For example in Spain, public Primary and Secondary Education centers depend on the public administrations responsible for education and the maintenance of buildings depends in many cases on local administrations. This implies that schools do not have the capacity to directly manage the energy sources used (for example for heating in the center, the source of a significant part of Carbon emissions) or to improve the isolation of buildings and thus save energy.



Images source: Pixabay

However, important actions can be taken at schools that can make a substantial contribution to improving the situation. For example, the educational centers can carry out school energy audits that contribute to raising awareness in the educational community about the importance of improving these aspects and demanding improvements at all levels.

Furthermore, it is possible to intervene directly to achieve the objective of climate neutrality in schools through another series of common good practices in relation to paper or water consumption, waste management, energy consumption in educational activities and trips, etc. We can also pursue the aim of Carbon neutrality through actions that facilitate a better balance between the CO₂ we emit and that absorbed from the atmosphere, promoting the creation of green masses that increase absorption.

Our main objective revolves around a global strategy to reduce energy consumption on the school premises. At the same time, we are committed to significantly reducing carbon emissions from commuting by encouraging students and staff to adopt sustainable transport alternatives, whether carpooling, cycling or using public transport.

A central aspect of our mission is also the conscientious management of waste reduction and recycling, as we strive to raise sustainability awareness not only of our students, but of the entire community in general.

We recognize that creating a sustainable future is not the sole responsibility of students; it is a collective effort that requires the active commitment of the entire community. Our goal is to cultivate a deep sense of environmental responsibility among students, their families and the broader community, fostering a shared commitment to sustainable living.

It is essential that from schools, apart from transmitting knowledge to students, that all experiences lived at the center are impregnated with values, habits, responsibility, respect, lifestyles ... that guide both the student body as to all the community educational; community-focused values and surroundings of the center and the environment and planet Earth as a whole. For this reason the motto "The future of the world is in my school" can be a good maxim to guide the educational program of this module of "Carbon Neutral Schools"

■ 14.1 OBJECTIVES

- Raise awareness about the importance of contributing to the transition towards Carbon neutrality, from all areas, including schools.
- Promote sustainable lifestyles and consumption from daily school practice (saving paper, water, energy, materials and resources in general, use of transport public, bike or walk whenever possible, reducing emissions, etc.).
- Promote the adoption of innovative and sustainable technologies in schools, promoting research and the application of solutions that reduce the carbon footprint and improve energy efficiency.
- Integrate climate education into school curricula and activities.
- Encourage collaboration and knowledge sharing on energy savings and sustainability among students, educational staff and the local community.
- Promote the incorporation of green and efficient technologies in the school environment to reduce the carbon footprint.
- Encourage participation in projects and activities that promote sustainability, both inside and outside the educational field.
- Carry out school energy audits using simple calculation tools.
- Contribute to reducing the Carbon footprint of all school activities, including online activities.

- Adopt those measures within our reach to compensate the Carbon footprint of the educational center.
- Contribute from schools to raise awareness in the community about the importance of carbon neutrality.
- Develop and apply study plans that incorporate key sustainability concepts in different subjects.
- Create educational activities that connect environmental topics with academic concepts, fostering comprehensive understanding.

■ 14.2 COMPETENCES

- Be aware of the problem of climate change and where we are on the road to its solution. Citizenship and scientific competences.
- Detect which of our actions emit a greater carbon footprint. Personal-social/citizen competences.
- Substitute those actions within our reach at school with others that reduce or cancel our carbon footprint. Entrepreneurial competence.
- Prioritise the use of energy in a sustainable way; transport, water, paper, etc. Scientific/Personal and Social/Entrepreneurial Competences.
- Research and plan actions that can offset our carbon footprint. Digital/Linguistic Competences.
- Develop plans to replace or minimise actions at school and in the immediate environment that will be exposed to the community in order to have an impact on the educational community. Digital Competences/Cultural Awareness and Expression.
- Discover and measure the carbon footprint of our digital activity. Digital Competences/ Learning to learn/ Citizenship/Linguistic Competences.

■ 14.3 CONTENTS

14.3.1. CONCEPTUAL CONTENTS

- Understand the importance of contributing to the fight against climate change from school, through all the activities carried out at the educational center.
- Know the contribution of school activities to the Carbon footprint.
- Understand the concept of energy audit and eco-audit.
- Understand the importance of sustainable management of the educational center, identifying actions and forms of energy savings and efficiency and sustainable habits applicable to the school context.
- Know the important Carbon footprint and environmental impacts behind our digital activities.

- Identify different solutions through which significant reductions in the school's Carbon footprint can be achieved.
- Know ways to compensate for Carbon emissions generated at school.

14.3.2. ATTITUDINAL CONTENTS

- Assumption of that each one of the actions carried out causes a Carbon footprint.
- Awareness about the importance of the school's contribution to improving environmental reality and fight against climate change.
- Reflection and assumption of that is necessary a change in our life style that respect and help to our planet.
- Adopting habits at school which minimize the Carbon footprint.

14.3.3. PROCEDURAL CONTENTS

- Investigate, analyze and compare the information found conducive to carrying out simple energy audits and/or calculations of the center's Carbon footprint.
- Dialogue about the different solutions to reduce the school's Carbon footprint.
- Resume, arrive to agreements and plan procedures to change practices that contribute to reducing emissions associated with school activities.
- Launch initiatives to disseminate and make known to the community and public authorities the results of the center's audits.
- Elaborate informative presentations using diverse applications (Power Point, Sway, canva, etc.) .
- Collaborate and exchange knowledge on energy savings and sustainability between students, educational staff and the local community.
- Promote the incorporation of green and efficient technologies in the school environment to reduce the carbon footprint.
- Participation in projects and activities that promote sustainability in the educational center and outside of it.

■ 14.4. EDUCATIONAL STRATEGIES

PRIMARY LEVEL:

- Investigation and study in groups about what a carbon neutral school is.
- Dialogue about what each group has discovered and why/what we want to change to become a carbon neutral school.
- Waste recycling workshops: composting, cooking oil recycling, etc.

- Sessions on “digital rubbish” for students and the educational community, encouraging to join us in these online cleaning events such as the “Day of the digital cleaning”. Because we aim that the future not only be digitized, but also green.
- Detect what actions can we carry to carry in our school, even in our around, to lower the Carbon footprint, save energy and promote the transition to Carbon neutrality.
- “Ideas contest” to decide what measures we actually want to implement and put into practice.
- Information campaigns for the community. Presentations will be designed (relying on new technologies: video, Power Point, Canva, etc.) by groups, to explain to the community educational what studied and we will try to involve the biggest number possible of people and institutions.

SECONDARY LEVEL:

- Informative talk about what an energy audit is and how to carry it out in a simple way.
- Carrying out an energy audit of the educational center with the help of teachers. Drawing conclusions.
- Approach to calculating the center’s Carbon footprint through simple tools. Implementation of its use and calculation of the Carbon footprint with the support of teachers.
- Brainstorming about concrete measures to take in the center, or even in its immediate environment (neighborhood, town, city...) to lower the Carbon footprint, save energy and thus promote the transition to Carbon neutrality. Subsequently, groups will be organized to carry out a brief project on the objectives and development of each of the measures.
- Ideas contest in which we will involve the educational community and/or the immediate surroundings of the center to decide what measures we eventually want to implement and put into practice.
- Celebration of commemorative days such as the Day to Fight Climate Change, organizing a program of activities in which we will involve the community. Activities will be included that allow the community to present educational the calculations made and the conclusions drawn, trying to involve the biggest number possible of people and institutions.
- Compilation and display of actions carried out and sharing them periodically on European educational platforms so that other schools know in that we have state working.
- Sessions on digital trash for students and the educational community, encouraging to join us in these online cleaning events such as the Day of the cleaning digital, for a digital transition that is as sustainable as possible.

■ 14.5. EVALUATION STANDARDS

- Attitudes and opinions expressed regarding the topic under study.
- Identification and explanation of the benefits and risks of using different energy sources.
- Analysis and decision making with the information obtained through own research, group research, interviews, etc.
- Identification of organisations or associations in his/her environment that can help in the achievement of his/her objective.
- Use of those digital tools and manuals that may facilitate the achievement of his/her aim; dissemination, petition, etc.
- Application of strategies to study and work in relation to his/her learning situation.
- Use of strategies to carry out individual and team work, showing skills for the peaceful resolution of conflicts.
- Exposition orally, in Spanish and English, of the main ideas worked on, supported by the presentations made.
- Participation with good attitude and respect in the different tasks proposed.





NEUTRAL SCHOOLS
Innovación y acción escolar para un futuro neutro en Carbono
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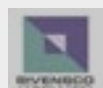
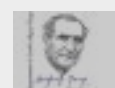
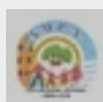
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EDUCATIONAL CURRICULUM



Neutral Schools

III. ANNEXES



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EDUCATIONAL PLATFORMS AND INFORMATION SOURCES

- ECO-SCHOOLS PROGRAM. Foundation for Environmental Education. Framework for schools to engage students in sustainability practices, along with resources and project ideas. <https://www.ecoschools.global/>
- THE UNITED NATIONS SUSTAINABLE DEVELOPMENT GOALS (SDGs). Educational resources related to climate action and sustainability, with activities linked to the SDGs. <https://sdgs.un.org/>
- WORLD WILDLIFE FUND (WWF) Education Resources. Lesson plans, activities, and multimedia resources focused on conservation and sustainability. <https://www.worldwildlife.org/>
- EARTHDAY.ORG. Curricula and educational resources on climate change (including a Carbon Footprint Calculator, a simple tool for kids to understand their carbon footprint and how to reduce it).
<https://www.earthday.org/>
<https://www.earthday.org/campaign/climate-environmental-literacy/>
- COPERNICUS User Learning Services. Free training on the use of the Climate Data Store platform and its content.
<https://climate.copernicus.eu/user-learning-services>
- ECMWF (European Centre for Medium-Range Weather Forecasts) E-learning resources
<https://learning.ecmwf.int/course/index.php?categoryid=8>
<https://learning.ecmwf.int/course/index.php?categoryid=8>
<https://www.un.org/en/climatechange/graphics#>
- WORLD METEOROLOGICAL ORGANIZATION WMO
<https://youth.wmo.int/es/clima#tab2>
- Educational resources to download from WMO
<https://youth.wmo.int/en/library>
<https://youth.wmo.int/es/library>
- UNITED NATIONS- UN CLIMATE CHANGE Reports
<https://www.un.org/en/climatechange/reports>
- UNITED NATIONS. UN CLIMATE EVENTS
<https://www.un.org/en/climatechange/events>

Your guide to action on climate change: energy in your home

<https://www.un.org/en/actnow/home-energy>

Actions for a healthy planet

<https://www.un.org/en/actnow/ten-actions>

- CLIMATE SCIENCE Solving climate change starts with understanding it
<https://climatescience.org/>
- IPCC (INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE) - WORKING GROUP III: MITIGATION OF CLIMATE CHANGE
<https://www.ipcc.ch/report/ar6/wg3/downloads/>
- BBC CLIMATE CHANGE. Plenty of information about climate change, including television programs about the subject
www.bbc.co.uk/climatechange
- CLIMATE PREDICTION. Gives you the chance to be involved in the largest simulation of global climate change ever conducted
www.climateprediction.net
- OXFORD UNIVERSITY CENTRE FOR THE ENVIRONMENT. Includes examples of current UK climate change research
www.ouce.ox.ac.uk
- REAL CLIMATE. A climate science commentary site written by working climate scientists for the interested public and journalists
www.realclimate.org
- UNITED NATIONS ENVIRONMENT PROGRAMME. Java Climate Model. The model that was used to provide much of the data in the game. You can try out different future climate scenarios and look at the outcome in terms of temperature, GDP etc.
<http://climatechange.unep.net>
- CLIMATE WIRE. A website detailing climate-related news from around the world
www.climatewire.net
- CLIMATE CHANGE NEWS. A climate change news website. Important articles are highlighted.
www.climatechangenews.org
- THE TYNDALL CENTRE. A cross-disciplinary academic body which develops sustainable responses to climate change
www.tyndall.ac.uk
- THE HADLEY CENTRE. The UK Meteorological Office's climate change research unit. It models current and future climate trends
www.metoffice.com

- Climate Change 2001: Impacts, Adaptation & Vulnerability, Contribution of Working Group II to the Third Assessment Report of the Intergovernmental Panel on Climate Change (IPCC)
www.grida.no
- Greenhouse gas emissions for 1990 – 2003 submitted to the United Nations Framework Convention on Climate Change
www.unfccc.int (PDF)
- Report by the Energy Savings Trust for the DTI on microgeneration potential in UK
www.dti.gov.uk (PDF)
- Special Report on Emissions Scenarios, Executive Summary, IPCC
www.ipcc.ch (PDF)
- UK Climate Change Programme 2006
www.defra.gov.uk (PDF)
- IDAE- INSTITUTO PARA LA DIVERSIFICACIÓN Y EL AHORRO DE ENERGÍA
<https://www.idae.es/ahorra-energia>
- MINISTERIO PARA LA TRANSICION ECOLÓGICA Y EL RETO DEMOGRÁFICO
<https://www.miteco.gob.es/es/cambio-climatico/temas.html>
https://www.miteco.gob.es/es/cambio-climatico/temas/impactos-vulnerabilidad-y-adaptacion/informedeparticipacionpublicapnacc2021-2030_tcm30-516368.pdf
- CENEAM- CENTRO NACIONAL DE EDUCACION AMBIENTAL
<https://www.miteco.gob.es/es/ceneam/inventario-educacion-ambiental.html>
<https://www.miteco.gob.es/es/ceneam/programas-de-educacion-ambiental.html>
- AGENCIA ESPAÑOLA DE METEOROLOGÍA
http://www.aemet.es/es/noticias/2019/03/Efectos_del_cambio_climatico_en_espanha/
- ECOVIDRIO
<https://hablandoenvidrio.com/cambio-climatico-en-espana-hechos-y-evidencias/>
- SEO OBSERVATORIO CLIMA
<https://observatorioclima.seo.org/>
- FUNDACIÓN NATURGY
<https://www.fundacionnaturgy.org/educacion-y-divulgacion/efigy-education/educacion-primaria/>
- PORTAL EDUCATIVO ARGENTINA. Uso responsable de la energía
<https://www.educ.ar/recursos/132531/uso-responsable-de-la-energia>

VIDEOS, INTERACTIVE TOOLS AND GAMES

- PBS LEARNING MEDIA. Videos on climate change, energy efficiency, and sustainability tailored for younger audiences.
<https://www.pbslearningmedia.org/>
- TED-Ed. Animated lessons that cover various topics related to climate change and renewable energy.
<https://ed.ted.com/>
- CLIMATE KIDS NASA. Engaging games, videos, and activities designed to teach children about climate change and its impact on the planet.
<https://climatekids.nasa.gov/>
- NATIONAL GEOGRAPHIC KIDS. Videos, educational games and articles about the environment and conservation.
<https://kids.nationalgeographic.com/>
- CLIMATE INTERACTIVE. Climate Change Games and Simulations that can help students understand climate models and energy solutions
<https://www.climateinteractive.org/videos/>
- NATIONAL SCIENCE TEACHING ASSOCIATION (NSTA). Professional development resources and lesson plans focused on science education, including climate change topics
<https://www.nsta.org/>
- Renewable Energy Sources for Kids (Learning Videos for Kids)
<https://www.youtube.com/watch?v=rK5f8KEKruc>
- Types of Energy for Kids - Renewable and Non-Renewable Energies
<https://www.youtube.com/watch?v=w16-Uems2Qo>
- Non-renewable Energy Sources - Types of Energy for Kids
<https://www.youtube.com/watch?v=MpEJnnpye-k>
<https://www.youtube.com/watch?v=QgcMeMWuZPA>
- CLIMATE SCIENCE Climate Change: How does it really work?
<https://www.youtube.com/watch?v=myZAvqqp9Jc>
- ENERGY QUEST. Games and quizzes to teach children about energy, conservation, and renewable resources.
<http://www.energyquest.ca.gov/>
- ECO RISE. Curricula and resources for educators to incorporate sustainability into their teaching.
<https://www.ecorise.org/>

- CLIMATE CHANGE. CLIMATE WEEK 2024
<https://youtu.be/Kky1XHWfeWs>
- UNITED NATIONS Videos of followers of "Act Now" around the world.
<https://www.un.org/es/actnow>
- WORLD METEOROLOGICAL ORGANIZATION
<https://www.youtube.com/worldmetorg>
<https://www.youtube.com/watch?v=IVlhDja-xUA>
https://www.youtube.com/watch?v=-D_Np-3dVBQ