Environmental Education Resources Guide

Acknowledgements

Author
Eloísa Tréllez Solís

Coordination and editing
Gloria Ordóñez Valenzuela under the supervision of Tomás Declercq, Ignacio Sánchez and Adriana Zacarías (United Nations Environment Programme - UNEP)

Team
Roxana Sánchez, Julius Ulrich, Andrea Vasquez

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Authors contributing country experiences
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Reviewers
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Design and layout
Jennifer Mejía Zeller

Rationale for the Guidelines

Environmental education is transversal. As an effictive and transformative tool, it is key to the fulfillment of the Sustainable Development Goals. The Environmental Education Guide is presented as part of the 2021- 2022 Work Plan and at the request of the member countries. The guide contains ten thematic environmental booklets designed to be reference material for primary school teachers and environmental trainers to support the inclusion of environmental themes and concepts in the formal and informal education sector. They were developed to generate collective reflection that helps people identify ways to solve environmental challenges.

The Environmental Training Network is an intergovernmental platform, coordinated by the United Nations Environment Program (UNEP) and comprising eighteen environmental education focal points within the Ministries of Environment. The network aims to strengthen and share knowledge and experiences in environmental education in the region, and defines itself as a community that promots action, cooperation, and the exchange of experiences and knowledge in environmental education, both face-to-face and online.

Red de Formación AMBIENTAL para América Latina y el Caribe

The Network reports to the Forum of Ministers of Environment of Latin America and the Caribbean. The Environmental Education Decision was adopted In Cartagena, Colombia, 2016, consolidating regional commitment to environmental education as a key element to transform values, behaviours and visions. During the XXI Meeting of the Forum of Ministers of Environment of Latin America and the Caribbean (Buenos Aires, Argentina, 2018), in the Declaration of Buenos Aires, the countries agreed: “To strengthen environmental education as a cross-cutting issue and provide more support to the Environmental Training Network of Latin America and the Caribbean to promote cooperation in the exchange of experiences among the countries of the region, generating synergies with other initiatives and Rationale for the Guidelines networks that promote environmental education”. It also responds to the UN Decade on Ecosystem Restoration: Action 3. Take ecosystem restoration into schools with the inclusion of a notebook focused on Ecosystem Restoration in Latin America.

INTRODUCTION AND MAIN GUIDELINES

The Environmental Education (EE) Resources Guide aims to promote interdisciplinary approaches, with a view to mainstreaming environmental education, and is primarily for teachers, multipliers and facilitators in Latin America and the Caribbean (LAC). This approach is more relevant and necessary to achieve a better vision and understanding of the relationships between humans and nature; between societies and cultures with the ecosystems on which they depend in the new context following the Covid-19 emergency.

This approach enables values-based education, which strengthens critical thinking, analytical skills, empathy, respect and co-responsibility for a collective environmental ethic. In turn, this allows for interesting approaches to finding solutions to environmental challenges, and can also be useful when trying to propose ways to increase awareness and action regarding the various environmental challenges experienced on a daily basis.

In addition to fostering a good understanding of the current situation and main environmental challenges at regional level in Latin America and the Caribbean, it is therefore also important to propose methodological alternatives that help create spaces for exchange and innovation to achieve concrete reflections and activities, supported by creative and participatory approaches.

This guide proposes a methodology for reflection and action: **Interdisciplinary Roundtables on Environmental Education for Sustainability,** to strengthen and complement environmental education processes carried out in educational centres and community groups, from an interdisciplinary, cross-cutting and systems thinking perspective.

Main guidelines

Environmental education's interdisciplinary perspective requires more and better methodologies to transcend the discipline-based approach of both school and university education. Little progress has been made towards interdisciplinary learning owing to historical processes of knowledge deepening and the traditional division of the sciences, disciplines and techniques. Work continues inside knowledge silos. However, important areas of knowledge are already working together, such as agroecology, biocultural anthropology, etc.

The logical progress of environmental education seeks spaces and requires connections between all knowledge and perspectives to allow us to act in an integrated and constructive manner. One response to this development is the Interdisciplinary Roundtables on Environmental Education for Sustainability.

Proposed methodology: Interdisciplinary Roundtables on Environmental Education for Sustainability - MIDEAS:

The proposed methodology Interdisciplinary Roundtables on Environmental Education for Sustainability *(Mesas Interdisciplinarias de Educación Ambiental hacia la Sostenibilidad - MIDEAS)* originates from the importance of **creating an active space for interdisciplinary reflection by teachers and facilitators,** in which training in the main contemporary environmental issues is provided and new contributions are generated, together with proposals or action projects, **based on their respective disciplines and experiences in the classroom and communities.** All this is designed to connect approaches and activities to make environmental education interdisciplinary.

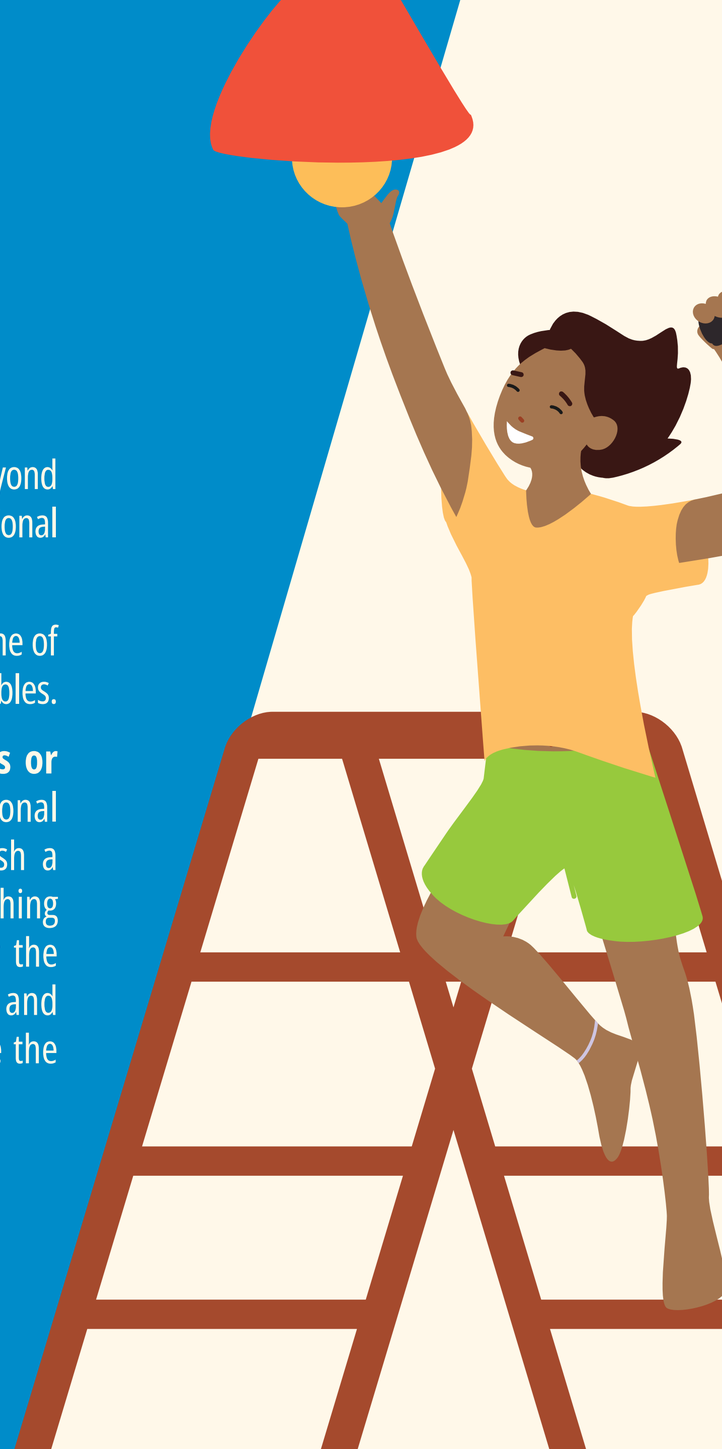
Composition of the Interdisciplinary Committees:

Creation of Interdisciplinary Roundtables in and with national educational centres and/or communities or other institutions to create active spaces for teachers and environmental facilitators to reflect and work. Establishing the scope of their work, with a level of institutional support.

Representatives and/or teachers from the various disciplines and fields of knowledge/experience should take part in the roundtables. Around two to three people from each field will carry out internal analyses in small groups from their own disciplines and experiences to be presented as working elements to the Interdisciplinary Roundtables. In some cases, final-year general basic education and high school students interested in or leading groups related to the environment could take part.

Steps for applying the Proposed Methodology MIDEAS:

1. **Introduction of the participants,** explanation of their expectations, interests and respective approaches to environmental education.
2. **Generation of working groups to form roundtables.**
3. **Designation of a person to coordinate** the work of the Bureau.
4. **Designation of** a person to present the central themes included in the Guide.
5. **Definition of starting points,** search for consensus on procedures to reach future individual and group work agreements.
6. **Agreement on a future set of sessions to achieve better interdisciplinary understanding of environmental education subjects,** with various innovative inputs and expectations. Explanation of the representative nature or direct connections of those involved, regarding their disciplines, fields of knowledge and responsibilities.
7. **Agreement to carry out some joint activities,** beyond subject work, sharing spaces and projections in the educational centre and with the community.
8. **Initial agreement on specific activities** related to some of the core issues and approaches to be shared at the roundtables.
9. **Close the meeting with a summary of learnings or emotions.** It is important to create the feeling of personal attention and team synergies. It is healthy to establish a personal space at the end of the meeting, to calm anything that may have happened during the meeting, and for the meeting facilitator to provide a few guidelines (time and specific questions) to gather people's feelings, evaluate the moment and close the interventions.



Development of the Proposed Methodology:

The working procedure set out in the methodology is eminently participatory and can be translated into working formats if appropriate. The procedure includes the following main elements:

- **Start from science-based learning, community knowledge and working practices.** Start with a global view that emphasises environmental situations and problems in Latin America and the Caribbean, as well as in the country where the proposed methodology is being used, supported by the Guide, collective experiences and additional material.

- **Encourage disciplinary analysis of this knowledge.** In order to specify the potential contributions from each discipline, form small disciplinary discussions groups to present findings that will be shared in a subsequent interdisciplinary session.

- **Jointly design a Desirable Scenario.** Generate a Desirable Scenario for the topic discussed in the interdisciplinary session, and each participant should contribute potential solutions to the problem from their respective perspectives. Prioritise known situations at local, national or regional level.

- **Generate a timetable of specific disciplinary and/or interdisciplinary activities.** Take the common Desirable Scenario as a basic guideline for proposing and implementing activities in the classroom, school and community. Treat the mutual learning and convergences discovered as important elements. Design and implement the set of specific activities for each of the main themes. These activities may include:

  - **Participatory and creative workshops**
  - **Games**
  - **Simulations**
  - **Field trips**
  - **Campaigns**
  - **Observatories**
  - **Presentations**
  - **Exhibitions**
  - **Creation of environmental networks or clubs**
  - **Experiments and/or short investigations**
  - **Seminars and online conferences**
  - **Among others**

- **Evaluate the activities carried out.** Organise the monitoring and analysis of the activities carried out using standard evaluation criteria.

How to implement the guide and recommendations

The guide develops and expands on each theme using the following structure:

- **Definition of the objectives** of every work module, and clarification of the **basic concepts.**
- Brief reflections on the **natural, social and cultural relationships** of the subject studied.
- Regional and national information. The proposed methodology recommends starting local and extrapolating to regional level.
- Details of the situation at global level are presented in each thematic area, specifying aspects of the situation in Latin America and the Caribbean.
- **Examples of subject-based input.** This analysis is followed by examples of contributions from the perspective of mathematics, natural sciences, social sciences, language and literature, arts and physical education.
- **Interdisciplinary activity proposal.** A Desirable Scenario and a first specific activity on the topic are proposed as an example. The steps and other constituent elements of the activity are proposed. A second complementary or follow-up activity is then put forward.

Some additional considerations on the Guide and the proposed methodology:

- **The activities are suggestions.** Some of the ideas expressed in the proposed subject activities are given as examples that can be applied to any of the topics in the guide, with the necessary clarifications.
- **The Guide is for both teachers and facilitators, promoting inclusion with a differential approach (gender, age and ethnicity).** Due to the necessary location or concrete localisation of the actions, the examples propose a series of activities to be carried out mainly by teachers and/or facilitators in educational centres and with a main, but not exclusive focus on Basic Education, (for students from 8-14 years of age). The facilitator is to make the adjustments necessary given the setting and target audience. This allows the guide to be applied in line with the different realities and participatory options deemed appropriate.

Encourage exchange and a series of joint actions. It is important to promote joint actions and exchanges between teachers, facilitators and communities. It is interesting to build bridges between formal education and non-formal and informal education, which is why the Guide tries to ensure that actions are not only limited to educational centres, but that they are reflected or carried out in other locations, including learning, awareness-raising and community settings.

ENVIRONMENTAL EDUCATION

ENVIRONMENTAL EDUCATION

- Basic concepts in environmental education
- Trajectory of environmental education at global level
- Evolution of environmental education in Latin America and the Caribbean

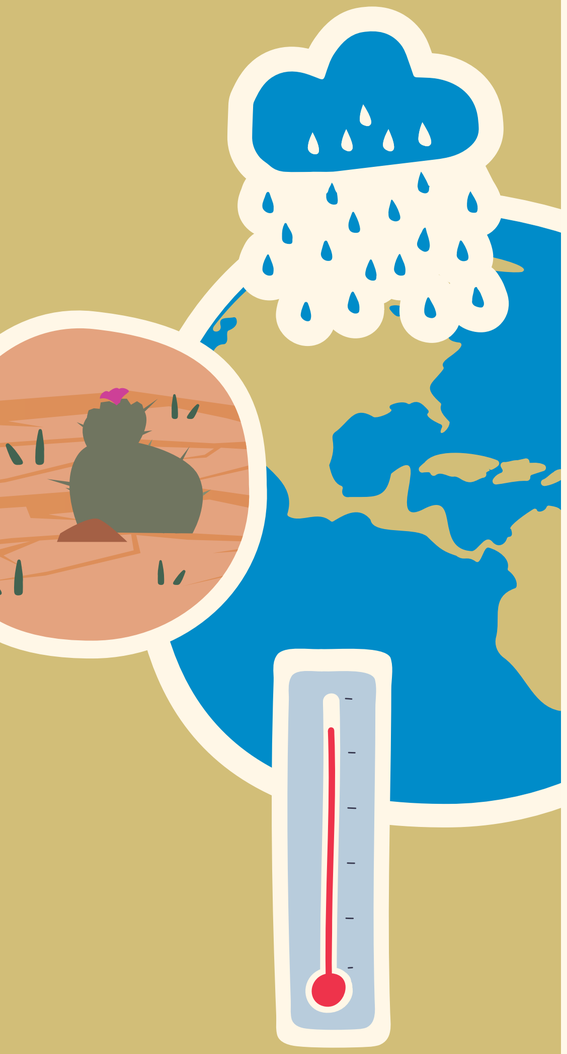
CONTEXT OR ENVIRONMENT

This concept evolves over time and is constantly being revised and deepened. Context is currently defined as the set of external conditions that influence humans, fundamentally arising out of social relations[1].

The word "environment" often has two connotations: one that refers to "the environment", material, tangible, or physical space, which could therefore sometimes exclude human beings; and the other aimed at highlighting the dynamics in the relationships between natural, social and cultural elements, which expresses the systemic concept of the environment most recognised and applied today. From this perspective, **it is a dynamic, adaptive and complex system**, comprising an **interacting** set of **natural, social and cultural elements in a given time and place, as well as the results of the interactions between them.** For example, the educational institution provides challenges, develops skills and capabilities in different disciplines to meet these challenges. The environment is not an educational resource; it is a precondition for human existence.

[1] UNESCO Regional Office for Education in Latin America and the Caribbean (Chile). (1989). Glossary of environmental terms. https://unesdoc.unesco.org/ark:/48223/pf0000085533

Basic concepts:



SYSTEM

A set of interacting elements[2] that influence each other to produce qualitatively new elements that were not present before the interaction took place.[3] Therefore, a systemic approach puts the study of interactions before the individual analysis of the constituent elements of the system. Thus, for example, an ecosystem is understood to be a biological system made up of a community of living beings that interact with each other and with their habitat.

ENVIRONMENTAL DEGRADATION

These are transformations in the environment, particularly of natural systems, mainly due to human activities that alter the environment, render it unproductive and lower its environmental quality[4].

ENVIRONMENTAL VALUES

Fundamental references for our connection with the planet and the environment. Values and ethical principles can move people to act and shape social behaviour through feelings and interests. Values may define the way you want to live and share.

Have a look at the ***Earth Charter***[5], a declaration of fundamental ethical principles for building a just, sustainable and peaceful global society. It is the product of global intercultural dialogue and promotes four core values: I. Respect and Care for the Community of Life; II. Ecological Integrity; III. Social and Economic Justice; IV. Democracy, Nonviolence and Peace. These values are important milestones for meeting the Sustainable Development Goals (SDGs).

In Latin America and the Caribbean, the ***Manifiesto por la Vida, por una ética para la sustentabilidad***[6], (Manifesto for Life: Ethics for Sustainability) is the result of a process of dialogue and an important reference for thinking about environmental values.

ENVIRONMENTAL ETHICS

moral principles that reflect our fundamental duties and responsibilities to nature, living beings and future generations[7]. Respect for nature, solidarity with living beings and wildlife, gratitude for the fruits of the earth and water, harmony in human habitats, as well as the willingness to care for and foster a constructive relationship with every being that shares this planet with human beings are indispensable for an ethical stance from an environmental perspective.

[2] Bertalanffy Von, L (1976). General Systems Theory. Editorial Fondo de Cultura Económica. Mexico.
[3] Afanasiev, V. (1977) The Scientific Management of Society, Progress Publishing House, Moscow.
[4] URegional Office for Education in Latin America and the Caribbean (Chile). (1989). Glossary of environmental terms. https://unesdoc.unesco.org/ark:/48223/pf0000085533
[5] Earth Charter International. (2020). Earth Charter. https://earthcharter.org
[6] Manifiesto por la vida: por una ética para la sustentabilidad. (Manifesto for Life: Ethics for Sustainability). (2002, June). Ambiente & Sociedade, 149-162. https://doi.org/10.1590/s1414-753x2002000100012
[7] LECAROS, Juan (2013) Environmental ethics: principles and values for a responsible citizenship in global society Acta Bioethica, 19 (2), 177-188 https://scielo.conicyt.cl/pdf/abioeth/v19n2/art02.pdf

Basic concepts:

ENVIRONMENTAL EDUCATION

is an ongoing process in which individuals and communities become aware of their environment and learn the knowledge, values, skills, experience and also the determination that will enable them to act, individually and collectively, to solve present and future environmental problems (UNEP, 1987).

Numerous proposals aim to define environmental education. Many of them agree on the importance of underlining that this is a participatory process and a pedagogical and interdisciplinary field that seeks to generate the construction of knowledge, values and environmental practices in order to promote individual or collective participation in its resolution. They emphasise the importance of ethics and values, as well as the importance of active learning for sustainable development. Experiences in different countries show various approaches and definitions that undoubtedly enrich the understanding of these processes at Latin American and Caribbean level.

[8] United Nations. (1987). Report of the World Commission on Environment and Development: Our Common Future. United Nations, General Assembly. https://sustainabledevelopment.un.org/content/documents/5987our-common-future.pdf
[9] UNESCO. (2021). Education for sustainable development. https://www.unesco.org/en/education/sustainable-development
[10] UNEP. (2014). UNEP Strategy for Environmental Education and Training. https://wedocs.unep.org/bitstream/handle/20.500.11822/11278/strat_full.pdf?sequence=1&isAllowed=y

SUSTAINABLE DEVELOPMENT

The Brundtland Report, known as One Earth, One World, or Our Common Future,[8] defined sustainable development as "Development that meets the needs of the present without compromising the ability of future generations to meet their own needs".

EDUCATION FOR SUSTAINABLE DEVELOPMENT

According to UNESCO[9], "Education for Sustainable Development (ESD) is education that empowers people to change their thinking and work towards a sustainable future". Education for sustainable development is essential to achieve the Sustainable Development Goals, to foster a more sustainable society and to make room for inevitable environmental variations.

ENVIRONMENTAL EDUCATION AND TRAINING FOR SUSTAINABLE DEVELOPMENT (EETSD)[10]

supports a holistic approach to protecting the environment and improving people's quality of life by developing and strengthening initiatives, which are responsive, locally relevant and aimed at transforming people's visions and aspirations into reality for

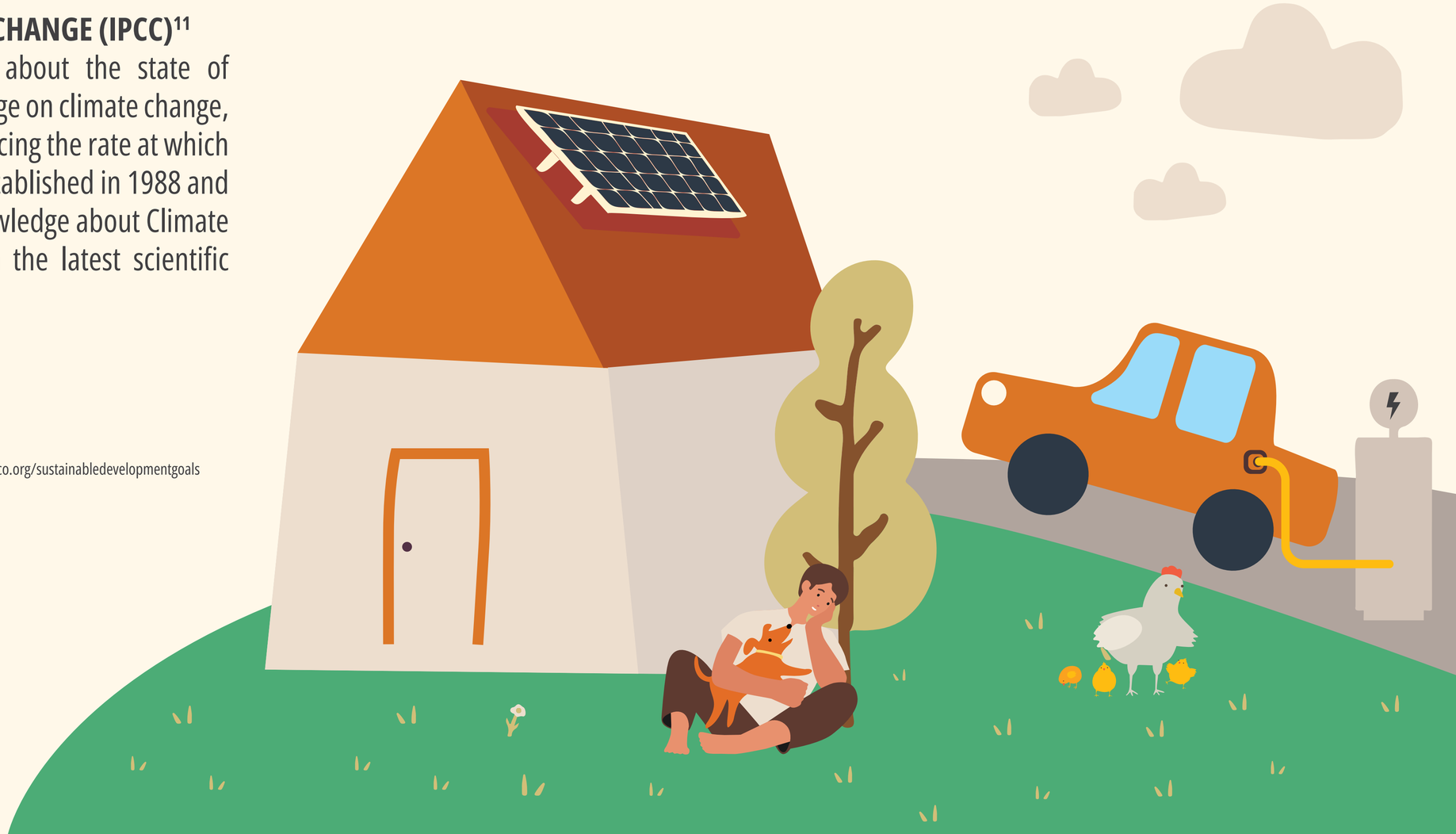
the present and future generations. It further states that “A holistic understanding of the environment in the context of sustainable development is central to this view of environmental education. Similarly, the term is a broad one that includes all aspects of education, communication and training for sustainable development.” (UNEP, 2005).

INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE (IPCC)[11]

prepares comprehensive assessment reports about the state of scientific, technical and socio-economic knowledge on climate change, its impacts and future risks, and options for reducing the rate at which climate change is taking place. The group was established in 1988 and has produced six reports on the state of our knowledge about Climate Change. Its advice and updates are based on the latest scientific knowledge and data on climate change.

SUSTAINABLE DEVELOPMENT GOALS (SDGS)

At the 2015 World Summit for Sustainable Development, UN Member States adopted the 2030 Agenda for Sustainable Development[12], which includes 17 goals and 169 targets. **These 17 Sustainable Development Goals aim to eradicate poverty, protect the planet and ensure well-being for all people.**



[11] https://www.ipcc.ch/
[12] UNESCO and the Sustainable Development Goals. (23 October 2018). UNESCO. https://en.unesco.org/sustainabledevelopmentgoals

Trajectory of environmental education at global level

This section provides a brief summary of the history and trajectory of environmental education based on a number of prominent international meetings, agreements and documents.

The 1972 Stockholm *United Nations Conference on the Human Environment,* adopted the **Report of the United Nations Conference on the Human Environment**[13] stating that education in environmental matters, for the younger generation as well as adults, giving due consideration to the underprivileged, is essential in order to broaden the basis for an enlightened opinion and responsible conduct by individuals, enterprises and communities in protecting and improving the environment in its full human dimension. It is also essential that mass media of communications avoid contributing to the deterioration of the environment, but, on the contrary, disseminate information of an educational nature on the need to protect and improve the environment in order to enable man to develop in every respect.

[13] United Nations. (1972). Report of the United Nations Conference on the Human Environment. https://digitallibrary.un.org/record/523249?ln=en#record-files-collapse-header

Another relevant international document, adopted in 1975, is ***the Belgrade Charter***[14] which established a framework for environmental education. It defines the goal of environmental education as being: "To develop a world population that is aware of and concerned about the environment and its associated problems, and which has the knowledge, skills, attitudes, motivation and commitment to work individually and collectively towards solutions to current problems and the prevention of new ones."

Later, the Intergovernmental *Conference on Environmental Education*[15] organised by UNESCO and UNEP, held in Tbilisi in 1977, clarified and defined numerous aspects that constitute its theoretical basis, starting from an understanding of the environment as a whole that encompasses both natural aspects and those derived from human activities.

The 1980s was an important decade, as the World Commission on Environment and Development (WCED) was established in 1983 and published *Our Common Future*, also known as the ***Rutland Report***[16] in 1987. It mentions the need for education in various areas, such as forestry resources, training local populations, forestry and agriculture, conservation, etc., and stresses the importance of achieving balanced development that harmonises economic development, social development and environmental protection.

Ten years after the Tbilisi meeting, UNESCO and UNEP jointly organised the 1987 International Congress in Moscow. The *International Strategy for Action in Environmental Education and Training for the 1990s*[17] was adopted as part of the event conclusions. It provided an international environmental education and training strategy for the next ten years.

In 1992, the Rio de Janeiro Summit, or Earth Summit, adopted ***the Rio Declaration on Environment and Development***[18]. Its 27 principles provide the foundations for environmental education processes. Principle 10 is particularly noteworthy: "Environmental issues are best handled with the participation of all concerned citizens, at the relevant level. At the national level, each individual shall have appropriate access to information concerning the environment

[14] UNESCO. (1975). The Belgrade Charter: A Framework for Environmental Education. https://unesdoc.unesco.org/ark:/48223/pf0000017772
[15] UNESCO. (1980). Environmental Education in the Light of the Tbilisi Conference. United Nations. https://unesdoc.unesco.org/ark:/48223/pf0000038550
[16] United Nations. (1987). Report of the World Commission on Environment and Development: Our Common Future. United Nations, General Assembly. https://sustainabledevelopment.un.org/content/documents/5987our-common-future.pdf
[17] DGMA-MOPU Educación Ambiental: situación española y Estrategia Internacional. [DGMA-MOPU Environmental Education: The Spanish Situation and International Strategy] Madrid, 1989.
[18] United Nations Conference on Environment and Development (Rio de Janeiro, B., & United Nations. (1992). Rio Declaration on Environment and Development: Forest Principles. Rio de Janeiro: United Nations Department of Public Information.

that is held by public authorities, including information on hazardous materials and activities in their communities, and the opportunity to participate in decision-making processes. States shall facilitate and encourage public awareness and participation by making information widely available. (...)"

This principle was then developed ***into Agenda 21***[19], an action for universal, national and local adoptions by United Nations organisations and agencies, governments and relevant actors in every area where humans influence the environment. Chapter 36[20] of Agenda 21: Promoting Education, Public Awareness and Training follows the recommendations of the Tbilisi Conference and establishes a series of specific programmes and activities.

The ***Convention on Biological Diversity***[21] entered into force as an international treaty in 1993 and aims to promote measures leading to a sustainable future. Article 13 is entitled Education and Public Awareness, and states that "The Contracting Parties shall promote and encourage understanding of the importance of and the measures required for the conservation of biological diversity, as well as its propagation through media, and the inclusion of these topics in educational programmes; and Cooperate, as appropriate, with other States and international organizations in developing educational and public awareness programmes, with respect to conservation and sustainable use of biological diversity".

[19] United Nations Conference on Environment and Development (Rio de Janeiro, B., & United Nations. (1992). Agenda 21: Action programme for sustainable development. Rio de Janeiro: United Nations Department of Public Information.
[20] United Nations Conference on Environment and Development (Rio de Janeiro, B., & United Nations. (1992). Agenda 21: Action programme for sustainable development. Rio de Janeiro: United Nations Department of Public Information.
[21] Rio de Janeiro, B., & United Nations. (1992). Convention on Biological Diversity. Rio de Janeiro: United Nations Department of Public Information.

The ***Framework Convention on Climate Change***[22], which entered into force in 1994, aims to achieve stabilisation of greenhouse gas concentrations in the atmosphere. On environmental education, it states that "The Parties shall promote and facilitate the development and implementation of education and public awareness programmes on climate change and its effects and the training of scientific, technical and managerial personnel".

Article 5 of the *United Nations Convention to Combat Desertification*[23] commits the parties to promote awareness and facilitate the participation of local populations, especially **women and young people.** It goes on to raise the importance of training and education to combat desertification and mitigate the effects of drought.

In 2005, UNESCO launched the **United Nations Decade of Education for Sustainable Development (2005-2014)**[24]. It aimed to mobilise the world's educational resources to create a more sustainable future.

[22] United Nations Framework Convention on Climate Change | Principle 10 Observatory. (1994). Observatory on Principle 10. Observatory on Principle 10 in Latin America and the Caribbean. https://observatoriop10.cepal.org/en/treaties/united-nations-framework-convention-climate-change

[23] United Nations. (1996). United Nations Convention to Combat Desertification in Those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa. Observatory on Principle 10. Observatory on Principle 10 in Latin America and the Caribbean. https://treaties.un.org/doc/Publication/MTDSG/Volume%20II/Chapter%20XXVII/XXVII-10.en.pdf

[24] United Nations. (3 September 2018). The United Nations Decade of Education for Sustainable Development. UNESCO. https://en.unesco.org/themes/education-sustainable-development/what-is-esd/un-decade-of-esd

[25] UNEP. (2014). UNEP Strategy for Environmental Education and Training. https://wedocs.unep.org/bitstream/handle/20.500.11822/11278/strat_full.pdf?sequence=1&isAllowed=y

[26] United Nations. (2011). Treaty on Environmental Education for Sustainable Societies and Global Responsibility Rio +20 Portal. Building the Rio+20 People's Summit. http://rio20.net/en/documentos/treaty-on-environmental-education-for-sustainable-societies-and-global-responsibility/

The **Strategy for Environmental Education and Training 2005-2014**[25] promoted environmental education approaches that respond to the need to improve the knowledge, skills and commitments enabling individuals and groups need to work towards a sustainable future; in a way that is sensitive to environmental and developmental issues and risks at all levels. This strategy aims to broaden understanding of environmental complexity and interdependence that is aware of different knowledge and social value systems regarding the environment and development, mobilising prior knowledge, fostering critical engagement and encouraging action; that is sensitive to changing contexts and needs, and promotes flexible processes that enable the development of meaningful learning and skills; that is also **socially transformative and supports educational approaches that promote understanding, empathy, ethical reasoning and commitment to action.**

In 2012, the **Rio+20 Meeting** ratified the Treaty on Environmental Education for Sustainable Societies and Global Responsibility[26], which states: "Environmental education for equitable sustainability is **a continuous learning process based on respect for all life.** Such education affirms values and actions which contribute to human and social transformation and ecological preservation."

In September 2015, the 70th UN General Assembly in New York adopted the **Sustainable Development Goals (SDGs)**[27]. Goal 4 is Quality Education[28] in order to "ensure inclusive and equitable quality education and promote lifelong learning opportunities for all". The Education 2030: *Incheon Declaration*[29] and Framework for Action for the implementation of Sustainable Development Goal 4, Towards 2030: A *New Vision for Education*, was adopted.

Environmental education is specifically covered by Goal 4: Quality Education. In particular under target **4.7: "By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development."**

It also has a role in Goal 12: Responsible production and consumption, because of its direct link to sustainable lifestyles. It is also related to SDG 5: Gender Equality, and SDG 3: Good Health and Well-Being. As well as SDG 2: Zero Hunger, because of its direct influence on the role of human beings in relation to the state of soils, oceans, forests, climate change and their repercussions on our ability to feed ourselves. Affordable and Clean Energy (SDG 7), and Sustainable Cities and Communities (SDG 11) are directly related to environmental education. And Climate Action (SDG 13), Life Below Water (SDG 14) and Life on Land (SDG 15) are also closely linked to environmental education. Like all human activities, environmental education must also support the achievement of peace, which will require forging partnerships and help achieve a more just and sustainable world (SDGs 16 and 17).

[27] UNESCO and the Sustainable Development Goals. (23 October 2018). UNESCO. https://en.unesco.org/sustainabledevelopmentgoals
[28] Gamez, M. J. (2015). Sustainable development goals and targets. United Nations. https://www.un.org/sustainabledevelopment/
[29] UNESCO. (2016). Education 2030: Incheon Declaration and Framework for Action for the implementation of Sustainable Development. https://unesdoc.unesco.org/ark:/48223/pf0000245656

The UNESCO Learning Objectives include a significant focus on education for Sustainable Development[30]. This document was published in 2017, is framed by Education 2030 and aims to help education professionals use ESD and consequently, to achieve the SDGs.

GLOBAL ENVIRONMENT OUTLOOK - GEO-6: HEALTHY PLANET, HEALTHY PEOPLE[31] is a series of international environmental reports resulting from a consultative and participatory process to provide an independent assessment of the environmental situation. It assesses the effectiveness of the policy response in addressing environmental problems and ways to achieve various internationally-agreed environmental objectives.

The global disruption to education caused by the Covid-19 pandemic is the worst education crisis on record. Most countries around the world closed schools, vocational and higher education institutions as part of their strategies to combat the pandemic, and almost all students worldwide have been affected. Often slow and invisible, this crisis is having a devastating impact on the future of children and young people around the world.

The UN Secretary-General's 2022 **Education Transformation Summit** was convened in response to the global crisis. The Summit provided a unique opportunity to elevate education to the top of the global political agenda and to mobilise action, ambition, solidarity and solutions to recoup pandemic-related learning losses and sow the seeds for transforming education in a rapidly changing world. It also **confirms that education must be transformed to respond to the global climate and environmental crisis.** In this sense, the **Greening Education Partnership** aims to provide strong, coordinated and comprehensive action that will prepare every learner to acquire the knowledge, skills, values and attitudes to address climate change and promote sustainable development.

[30] Rieckmann, M. (2017). Education for Sustainable Development Goals: learning objectives. Van Haren Publishing.
[31] United Nations Environment Programme (UNEP). (2019). Global Environment Outlook 6. https://www.unep.org/resources/global-environment-outlook-6

Evolution of environmental education in Latin America and the Caribbean

In Latin America and the Caribbean, educational processes have had, over time, different focuses and approaches, with valuable contributions from the region's educators, pedagogues and philosophers, who guided many of the approaches related to the necessary humanistic vision, their connection to national realities, participation and research for action.

Environmental education has diverse approaches and multiple definitions, related to the experiences and approaches within national frameworks, national environmental and educational authorities, and in relation to reflections and actions from other international, national or local organisations.

In the 1960s, the ecological trend prevalent worldwide led to the launch of some educational actions, and in the 1970s, especially after the Belgrade meeting of 1975, interest groups with a different vision, with a broader approach to nature and society, were formed in various countries. The Sub-Regional Meeting on Environmental Education for Secondary Education was held in Chosica, Peru, in 1976.

The region received an important contribution from the United Nations Environment Programme (UNEP) with the 1983 creation of the Environmental Training Network of Latin America and the Caribbean[32] at the request of the region's governments and in response to the need to strengthen professional capacities in environmental issues. Under the framework of the Environmental Training Network's initial activities, a series of meetings, contributions and debates on the central themes of environmental education processes for the region began.

A variety of outstanding Latin American philosophers, educators, economists and other professionals including Augusto Ángel Maya, Enrique Leff, José María Montes, Osvaldo Sunkel, Margarita Marino de Botero, Rolando García, Héctor Sejenóvich, Vicente Sánchez, Pablo Gutman, Gilberto Gallopin made important contributions to ecodevelopment, the environmental perspective of development, complex systems, interdisciplinary approaches, interculturality, holistic

[32] http://www.pnuma.org/educamb/objetivo.php
It is worth noting that as an intergovernmental platform that promotes the exchange of knowledge, good practices and experiences in environmental education, the Network remains a valuable means of articulation and mutual knowledge for countries and their environmental authorities, and currently works with 20 directors of environmental education at ministries or environmental authorities. It also promotes a work plan to reinforce studies, publications and South-South cooperation in the field of environmental education.

views and complexity, thus advancing diverse creative possibilities to configure new environmental knowledge, and the region's own environmental thinking, to specifically help define the fundamental aspects of this subject in the region, to work towards a sustainable future[33].

Some of these approaches and analyses are summarised in this reflection: **"The environment emerges as a kind of knowledge that reintegrates diversity, new ethical and aesthetic values, and the synergistic possibilities generated by the articulation of ecological, technological and cultural processes"[34].**

In the 1970s and 1980s, Ministries of the Environment, with environmental education directorates or programmes, began to emerge simultaneously in Latin America and the Caribbean. This led to progress in subject teaching and educational practices at the formal, non-formal and informal levels, in coordination with the Ministries of Education. The UNEP and UNESCO University and Environment in Latin America and the Caribbean Seminar[35] was held in Bogotá in 1985, proposing the incorporation of the environmental dimension in higher education, as well as in the various sciences, providing innovative approaches and elements that contributed to new university options in the region.

It is worth noting that, over the course of almost three decades during the 1990s, seven Ibero-American Congresses on Environmental Education[36] were held, sharing experiences and establishing various guidelines in relation to environmental education and its regional vision through joint papers and declarations.

This starting point led to numerous subsequent experiences, in which countries articulated their environmental education ideas and practices around the processes of sustainable development and environmental education. Contradictory positions between education for sustainable development and environmental education were overcome by a perspective for understanding the connections between both approaches, which led to widespread understanding of Environmental Education for Sustainable Development.

The trajectory, experiences and inclusions of environmental education subjects in Latin America and the Caribbean were reflected in these congresses. The second Congress highlighted the role of environmental education as an instrument for progressing towards a society of solidarity, democracy and justice. The third Congress analysed environmental education in the region, supporting its ongoing definition and relevance for the people and cultures of Ibero-America. The fourth Congress stressed the importance of environmental culture

[33] It is important to note that both terms are used synonymously in the various countries in this region.
[34] Leff, E. (1998) Saber Ambiental, Sustentabilidad, Racionalidad, Complejidad (Environmental Knowledge, Sustainability, Rationality, Complexity). Mexico, Ed. 21st century.
[35] ICFES (1985). Universidad y medio ambiente en América Latina y el Caribe (University and the Environment in Latin America and the Caribbean). https://eaterciario.files.wordpress.com/2015/09/universidad-y-medio-ambiente-en-america-latina-unesco-1985.pdf
[36] An account of all seven congresses and their main documents can be found in the report of the Seventh Congress, which took

and the recognition of nature as inseparable from people, societies and cultures, and defined environmental education as an aspect of holistic education that includes the relationship between environment and development. The fifth Congress argued that environmental education should be related to globalisation and the UN Decade of Education for Sustainable Development, emphasising collective and participatory action. The sixth Congress specified that environmental education is related to the ethical responsibility to contribute, from the local to the continental, to the debate to achieve political commitment in which collective action strategies converge.

Finally, in 2014 the seventh Congress emphasised the theme of Community Environmental Education. It adopted a joint declaration expressing elements of regional progress and its approach to environmental education: **"We consider the transformative and political perspective of environmental education to be indispensable for a full life (sumaq kawsay). This means it must be comprehensive, systemic, cross-cutting, contextualised, proactive, forward-looking and with biospheric equity. It also entails environmental responsibility for our shared assets, in dialogue with intercultural knowledge, under the framework of peaceful and harmonious coexistence with gender equality and intergenerational solidarity"[37].**

As can be seen in this brief overview, major advances have been made in environmental education in Latin America and the Caribbean, as not only have each of the countries carried out numerous experiences, expressed in programmes, documents, manuals and proposals, but they have also integrated transcendental approaches and concepts that have marked its evolution. These include the insertion of interculturality, the relationship with ancestral knowledge, the interdisciplinary approach, the gender, intergenerational and intersectoral focus, the link with the interpretation of natural and cultural heritage, the connection with environmental, risk and socio-environmental conflict management, and many more.

In 2018, the **Buenos Aires Declaration**[38] was approved at the XXI Meeting of the Forum of Ministers of the Environment of Latin America and the Caribbean, which reaffirms "the relevance of Environmental Education as an unavoidable instrument of environmental management to build citizens that are ethically committed to caring for the environment". And it proposes to **"strengthen environmental education as a cross-cutting issue and provide more support to the Environmental Training Network of Latin America and the Caribbean to promote cooperation in the exchange of experiences among the countries of the region, generating synergies with other initiatives and networks that promote environmental education".**

[37] Peruvian Ministry of Environment. (2014). VII Ibero-American Congress on Environmental Education. VII Ibero-American Congress on Environmental Education (CIDEA7). https://www.minam.gob.pe/cidea7/documentos.php#

[38] XXI Meeting of the Forum of Ministers of the Environment of Latin America and the Caribbean. (2018). Buenos Aires Declaration. https://wedocs.unep.org/bitstream/handle/20.500.11822/26515/BuenosAires_Declaration.pdf?sequence=2&isAllowed=y

A study on the systematisation of education experiences[39] considered various proposals and experiences in the region's countries that used integration visions in environmental education for sustainable development processes. This analysis resulted in the following nine elements that allow for views and ideas of inclusive environmental education:

- A **systemic, integral and dynamic vision of the environment,** understood as the result of the relationships between society, nature and cultures, towards critical and constructive thinking.
- An educational proposal, in formal, non-formal and informal education, with **eminently participatory, intercultural and gender-focused foundations and links to the community and between all generations.**
- Key issues related to global environmental challenges and priorities and their regional and local forms, such as biodiversity loss, climate change and pollution. All this linked to environmental, socio-environmental conflict and risk management processes, including the achievement of equitable economic benefits for the populations involved.
- **Interdisciplinary analyses**, from the various sciences, natural, human, social and formal science disciplines.
- Technological, technical and application aspects from fields including the health sciences, engineering, agronomy, agroforestry, physical education.
- **Recovery and revaluation of traditional, ancestral and local knowledge,** supported by the study and understanding of diverse world views.
- **Contributions aimed at** fostering **creativity and raising awareness,** involving the confluence between the various forms of artistic expression[40]. In short, the fine, visual, plastic, decorative, applied and performing arts.
- Fundamental elements of environmental communication and environmental citizenship, and considerations regarding the interpretation of natural and cultural heritage.
- **An ethical foundation,** for the recovery and implementation of **fundamental values and solidarity with people, nature and peace.**

The integrated approach to environmental education and the creative spirit now commit environmental educators in Latin America and the Caribbean to continuous and innovative analysis in order to act to overcome environmental problems and promote actions for conservation, valuation and care from both social and economic perspectives, considering the region's natural and cultural wealth as central to an important path towards achieving a sustainable future.

[39] Developed within the framework of the Environmental Training Network
[40] Such as architecture, music, theatre, oral storytelling, dance, painting, sculpture, illustration, drawing, printmaking, ceramics, photography, film and literature.


WATER

WATER

Objectives:

- Provide teachers and facilitators with basic conceptual information and food for thought on the topic of water, notably regarding its importance for people and living beings, together with some aspects related to the situation in Latin America and the Caribbean.
- Share possible disciplinary contributions on the theme of water and propose a set of interdisciplinary activities to be carried out in schools and with the community.

Basic concepts:

WATER

Water is a natural resource for life. It is a liquid substance that has no odour, taste or colour, exists in various forms in nature and covers approximately 70% of the Earth's surface. Although its chemical formula is H2O, meaning it has two hydrogen atoms and one oxygen atom, water actually contains more than these molecules as other elements gradually appear in its composition as it travels through different spaces, for example, mineral salts, heavy metals and various pollutants, bacteria, microorganisms, etc.

WATER ON OUR PLANET

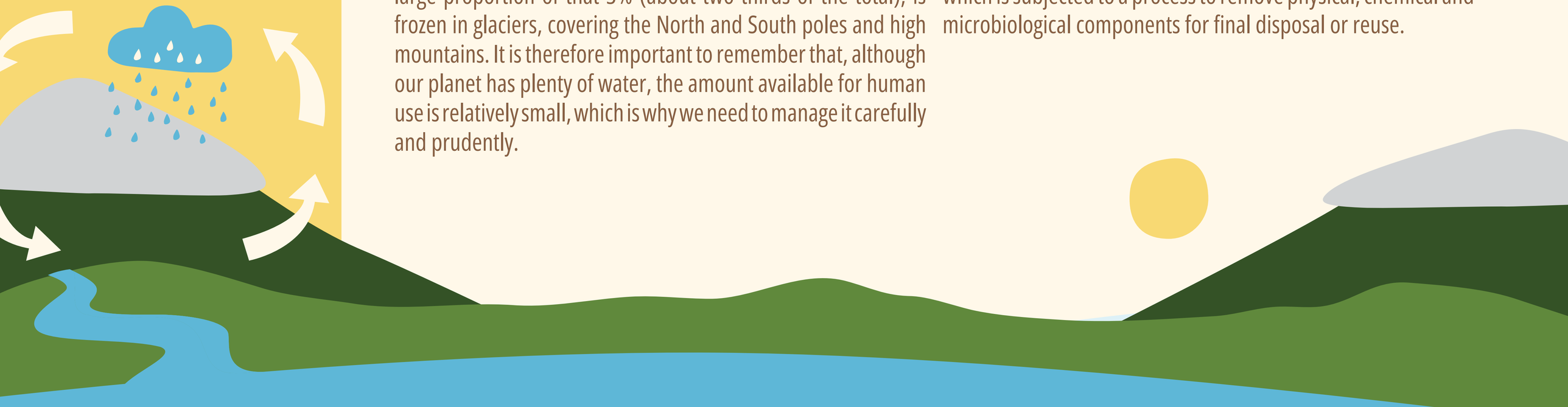
Of all water on Earth, 97% is salty, (the water in the seas and oceans), and only 3% is fresh water (does not contain salts). A large proportion of that 3% (about two thirds of the total), is frozen in glaciers, covering the North and South poles and high mountains. It is therefore important to remember that, although our planet has plenty of water, the amount available for human use is relatively small, which is why we need to manage it carefully and prudently.

THE WATER CYCLE

Water starts in the seas and oceans evaporates into the atmosphere, rains on the land and returns to the seas and oceans via rivers, streams, wetlands, streams and lakes. Precipitation, rainfall, evaporation and various filtrations to aquifers, (the geological formations where water accumulates underground), occur throughout this special cycle.

TYPES OF WATER

Water can be classified into the following categories: Raw Water found in the environment that has not received any treatment; Potable Water, which is considered fit for human consumption; Wastewater, the liquid discharged after the use of water in domestic or non-domestic activities; and Treated Wastewater, which is subjected to a process to remove physical, chemical and microbiological components for final disposal or reuse.



Basic concepts:

DRAINAGE BASINS

These territories drain water to the sea through a single river or discharge their waters into a single lake where the waters have no outlet, i.e. an endorheic lake. These basins are delimited by an imaginary line joining the points separating two watersheds, or drainage divides. The drainage basin is a system that includes a set of interrelated elements forming part of both the physical environment and the living organisms found in that territory. It also includes a number of social and economic uses.

[41] United Nations. (16 December 2010). La importancia de los acuíferos subterráneos (The Importance of Underground Aquifers). UN News. https://news.un.org/es/audio/2010/12/1391261

AQUIFERS

Water reservoirs located below the earth's surface that allow water to circulate through cracks and pores. Aquifers are an important freshwater reserve. Aquifers hold over 95% of the planet's available freshwater and most lie across borders[41].

WATER FOOTPRINT

nvironmental impact indicator that quantifies the water used, directly or indirectly, in production processes, and significantly shows the cost of consuming food or carrying out different socio-economic actions.

WETLANDS

Any area of land that is saturated or inundated with water on a seasonal or permanent basis. Because it is regularly covered by water, the soil becomes saturated and devoid of oxygen, resulting in a hybrid ecosystem of purely aquatic and terrestrial ecosystems. Wetlands are considered the most biologically diverse of all ecosystems and are also fundamental to nature for the wide range of ecosystem services they provide.

WATER AND THE SUSTAINABLE DEVELOPMENT GOALS (SDG): Goal 6: Clean Water and Sanitation, aims to ensure availability and sustainable management of water and sanitation for all. Find out more about SDG 6 here

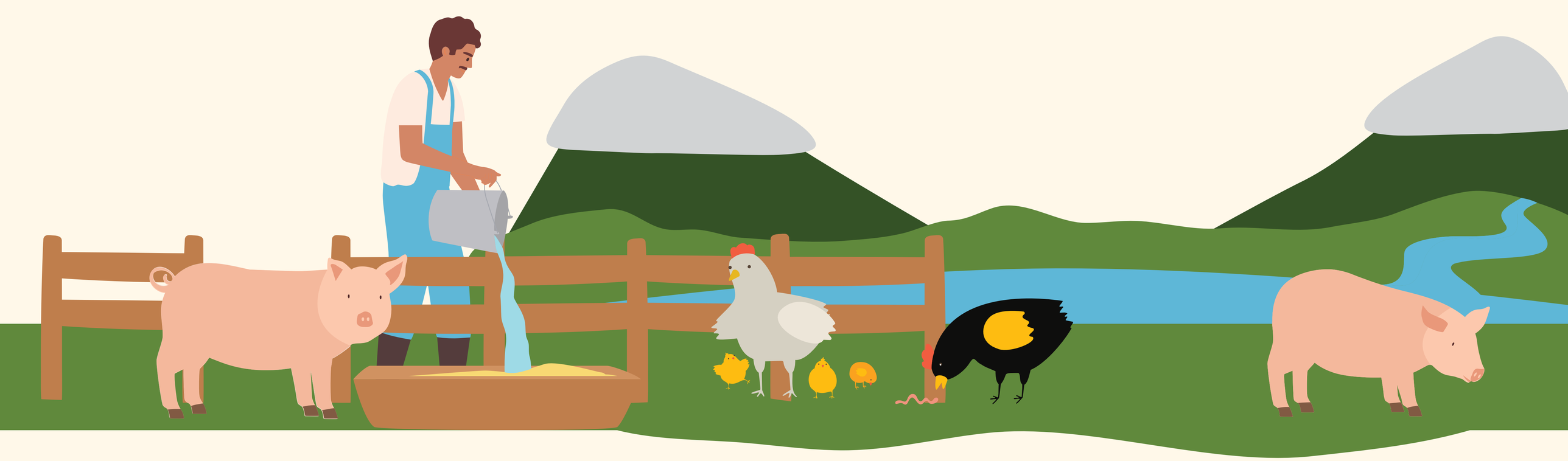
Our connections with water:

In 2010, the General Assembly of the United Nations recognized, through Resolution 64/292 recognized, through Resolution 64/292, the human right to water and sanitation, reaffirming that access to safe drinking water and sanitation to water and sanitation, reaffirming that access to clean drinking water and sanitation are essential for the water and sanitation are essential for the realization of all human rights.

Click here!

Likewise, in 2022, the United Nations General Assembly declared that every person in the world has the right to a safe, clean, healthy and sustainable environment. The resolution also recognizes that the impact of climate change, unsustainable management and use of natural resources, pollution of air, land and water, inadequate management of chemicals and waste, and the resulting loss of biodiversity interfere with the enjoyment of this right. This decision is an important step in countering the alarming triple global crisis and is the and is the result of decades of struggle by activists, indigenous peoples, scientists and other stakeholders, indigenous peoples, scientists and other civil society actors.

In addition to this fundamental, practical relationship, we also relate to water through our senses. We enjoy the feel of water on our bodies when we bathe, at home, in a river or lake, in the sea. Feeling and admiring its strength in waterfalls. Contemplating the rain and celebrating its arrival after a drought. Listening to the music of falling water, as it whispers in waves washing up on the beach. Savouring and enjoying a glass of water, when tormented by thirst. Watching and admiring sea horizons and whirlpools.



Our social relationship with water is expressed in various ways. We refer to water as a “resource” when we consider how it contributes to our well-being and socio-economic development. Water is generally defined as “renewable”, but not inexhaustible, as it is replenished through its natural cycle, but this process requires good governance, **management and regulations. For example, overexploitation of groundwater prevents it from filling back up naturally, which can have negative impacts like the drying up of aquifers, wetlands, springs and can even cause saline intrusion.**

Water is also important for society in things like agricultural and livestock production, industrial uses and electricity generation. The loss of resupply zones, pollution of water bodies, and dependence on this resource in extensive agriculture, livestock and industry affect the water cycle, which impacts human and natural communities. In response, in 2010, the United Nations General Assembly recognised, through Resolution 64/292, the human right to water and sanitation, reaffirming that access to clean drinking water and sanitation are essential for achieving all human rights. While access to clean water is a human right, it is also our duty to care for and not waste or pollute water, to help ensure it is properly used and distributed.

In terms of our cultural relationship with water, it should be noted that there are numerous indigenous peoples and nationalities, Afro-descendants and community organisations that have a special relationship with water in all Latin American and Caribbean countries. Water ceremonies are known in many regions, water is considered sacred, and it is associated with myths, legends and various deities. Water worship temples were also built and some natural spaces, such as lagoons, mountains or glaciers, are still considered sacred and are home to ceremonies of thanksgiving and respect.

These communities' knowledge about water care and conservation is still very important, and its true value and meaning must be appreciated.

Many religions around the world also use water in their ceremonies and rites, in baptism, in purification, giving it prominent recognition. It is necessary to take up this knowledge again, and to coincide with the various ceremonial and respectful approaches to water, thanking it for its contribution to life on the planet.

The way we use and care for water expresses the real value we place on it in each of our daily activities and in the pursuit of care and closeness to nature.

"Water Culture Programmes" are being developed at national and local levels and for different audiences in several countries. In this context, it is essential to make progress in raising awareness of the importance of water in our lives, sharing the conviction that water is linked to life, peace and the development of all our peoples.

Context in Latin America and the Caribbean

According to the Regional Report on Water in Latin America and the Caribbean[42], the region is frequently cited globally as an area of the planet with an abundance of water resources. Indeed, with average annual rainfall of 1,600 millimetres and an average run-off of 400,000 cubic metres per second, it accounts for almost a third of the world's water resources.

However, the region is home to 6% of the world's population and represents 13% of the world's total surface area. This means that while the average water availability per inhabitant in this region is approximately 22,000 cubic metres per inhabitant per year, globally it is only just over 6,000 cubic metres.

As favourable as these indicators are from the perspective of global water availability, the report points out that the region's geography heavily conditions access. In fact, the region presents a great heterogeneity in the spatial distribution of water resources, so that it simultaneously contains the driest desert in the world, with sectors of practically non-existent rainfall, and areas with a hyper-hydric regime.

Most countries in the region generally have "high" and "very high" water availability according to their area and population, but this does not always mean that water is actually accessible to all. A number of countries do not have adequate drinking water coverage for all their inhabitants and there are large differences between urban and rural areas.

[42] ECLECLAC. (2018). Proceso regional de las Américas Foro Mundial del Agua 2018 (Americas Regional Process - World Water Forum 2018. https://www.cepal.org/sites/default/files/news/files/informe_regional_america_latina_y_caribe.pdf

However, it is worth noting that an important global aquifer reserve is located in the region: the transboundary Guarani Aquifer, in areas of Brazil, Argentina, Uruguay and Paraguay. The total area of the Guarani Aquifer is estimated to be 1,190,000 km2 with 225,000 km^2 in Argentina, 850,000 km2 in Brazil, 70,000 km^2 in Paraguay and 45,000 km^2 in Uruguay.

About 24 million people live in the area delimited by the aquifer boundaries and a total of 70 million people live in areas that directly or indirectly influence the aquifer. It is mainly used to supply drinking water, but it is also used for industry, agriculture and thermal tourism[43].

However, 59% of the wetlands in Latin America are in decline, making it the region with the highest rate of wetland deterioration in the world[44]. A Quadrennial Report on Regional Progress and Challenges in Relation to the 2030 Agenda for Sustainable Development in Latin America and the Caribbean[45] was presented at the Latin American and Caribbean Countries Forum on Sustainable Development in 2019[46]. **The report indicates that in Latin America and the Caribbean, 91 million people still lack basic sanitation and 24 million lack basic water services. Pressure on water supply and sanitation services has increased due to growing urbanisation.**

[43] OAS. (2008). Environmental Protection and Sustainable Development of the Guaraní Aquifer System. Department of Sustainable Development - Organization of American States. https://www.oas.org/DSD/WaterResources/Pastprojects/Guarani_eng.asp
[44] Global Wetland Outlook. Ramsar Convention Secretariat. (2018). Global Wetland Outlook https://www.global-wetland-outlook.ramsar.org/
[45] ECLAC. (2019). Quadrennial report on regional progress and challenges in relation to the 2030 Agenda for Sustainable Development in Latin America and the Caribbean https://foroalc2030.cepal.org/2019/en/documents/quadrennial-report-regional-progress-and-challenges-relation-2030-agenda-sustainable
[46] ECLAC. (2019). Quadrennial report on regional progress and challenges in relation to the 2030 Agenda for Sustainable Development in Latin America and the Caribbean https://foroalc2030.cepal.org/2019/en/documents/quadrennial-report-regional-progress-and-challenges-relation-2030-agenda-sustainable

Thematic contributions:

Teachers and facilitators can start by analysing their discipline, sector, field of knowledge or experiences in order to find contributions to the understanding of environmental issues. This process starts with basic identification and continues with potential applications or examples. Subsequently, alternative approaches connected with other fields of knowledge can be found to generate creative ideas.

Mathematics:

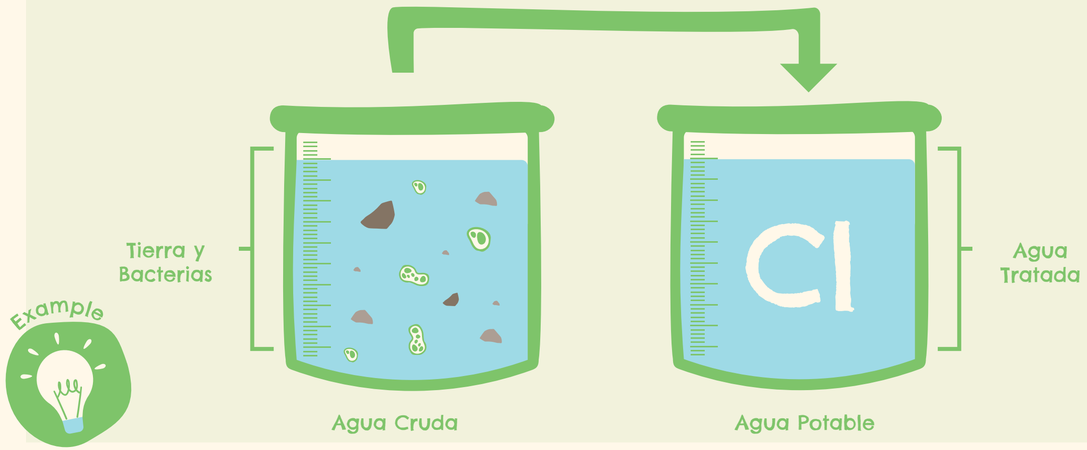
- Analyse the mean water consumption[50] at school or household level. Research and develop a list of the most efficient water-saving measures. If possible, compare water bills after the water saving measures have been implemented.
- Work out the Water Footprint by coming up with some examples in the classroom and using basic parameters[51] or online calculators. Recommended website for water footprint calculation: https://www.watercalculator.org/wfc2/esp/

[50] Arithmetic mean that requires knowing approximately how much water is consumed in the school, by the people who work, and study there; and the water consumed in the household, considering the number of people who live there.

[51] Producing one litre of milk requires 1,000 litres of water, one kilo of maize requires 900 litres, one kilo of wheat requires 1,300 litres, one kilo of beef requires 16,000 litres, one kilo of chicken requires 3,500 litres, 1 kilo of rice requires 3,000 litres. To produce one kilo of cotton we need 10,000 litres, one cotton T-shirt needs 2,500 litres, one pair of trainers needs 4,400 litres, 1 kilo of paper needs 2,000 litres. Using one sheet of paper = 10 litres of water.

Natural Sciences:

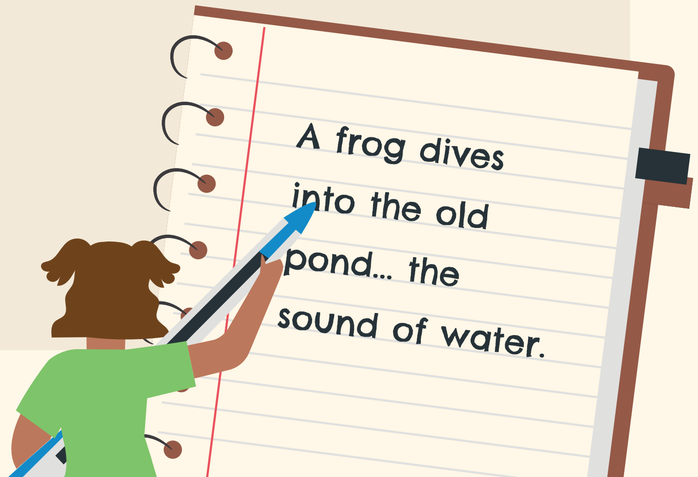
- Recognise the characteristics of water: the cohesive force between its molecules, surface tension, the impossibility of compressing it, etc.
- Explore inventions and innovations to reduce water shortages.
- **Explain water purification and treatment processes. Recognise those at home and/or in school. Visit to the city's water treatment facility.**



Language and Literature:

- Ask students to write a story about water and nature, analyse the results and ask if they'd like to publish a few in a simple format.
- **Select a poem, story or tale by a well-known author[52] that is related to water in order to analyse its contents and message, for example: Eduardo Nogales "Cantarán los pajonales" (Song of the Scrublands). Select and analyse another poem by a national or local author. Encourage students to write poems on this theme.**

[52] For example one of Bashoo's Japanese poems:
A frog dives into the old pond... the sound of water.



Social Sciences:

- Examine national or local history as it relates to access to water.
- Analyse the human right to water, privatisation, the bottled water industry and its impacts.
- Analyse conflicts between countries on the issue of water sharing in transboundary basins.
- **Analyse water scarcity as a source of urban or rural social conflicts, migration.**

Example

The Arts:

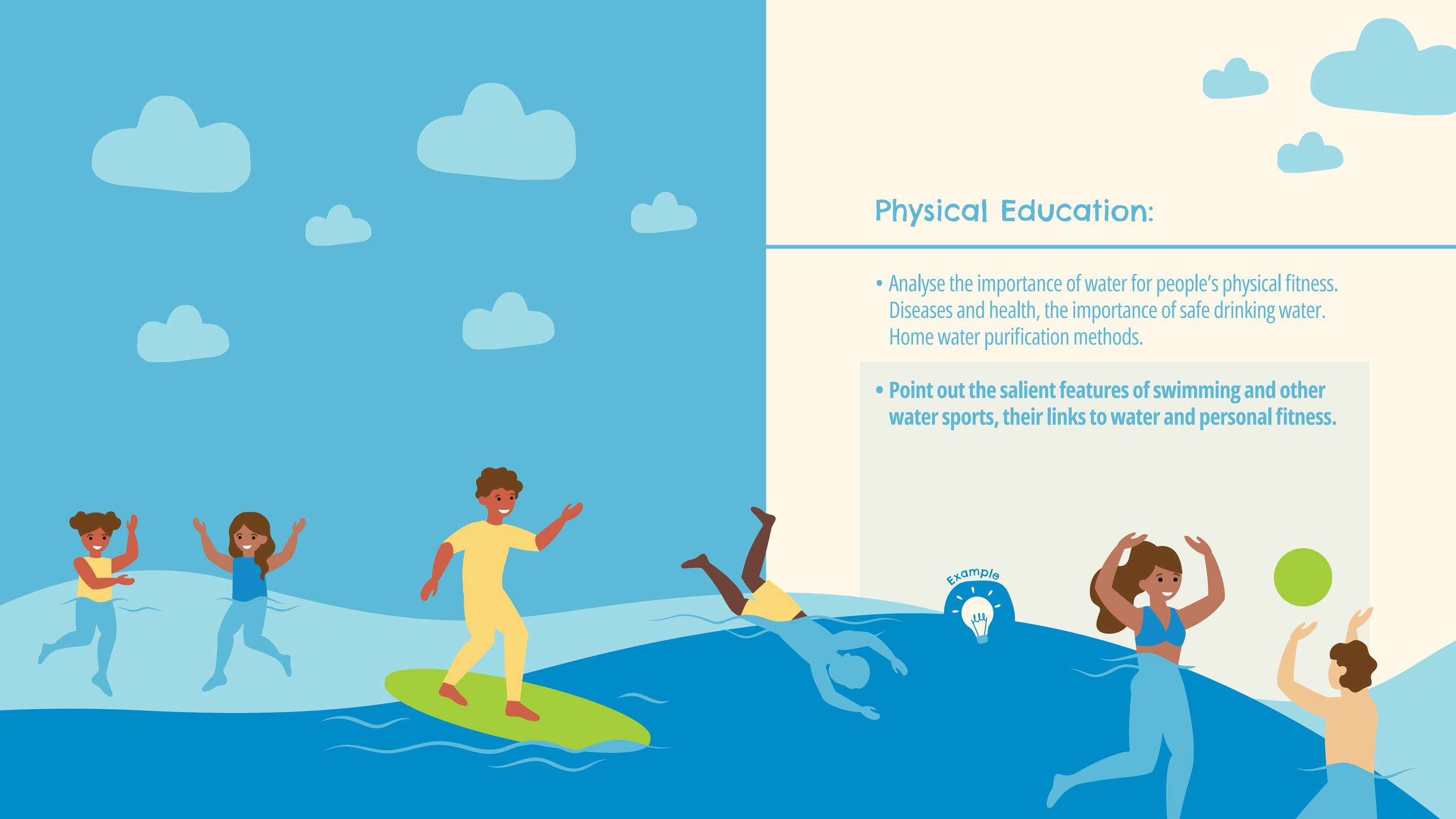
- Present local or regional myths or legends about water and rehearse a story told by the pupils.
- **Study the sound of water in rivers, seas or waterfalls and its vibratory connection with music together. Study the sounds of animals near bodies of water, as opposed to near living things. Relate this to the feeling of peace and harmony.**

Example

Physical Education:

- Analyse the importance of water for people's physical fitness. Diseases and health, the importance of safe drinking water. Home water purification methods.

- **Point out the salient features of swimming and other water sports, their links to water and personal fitness.**



Possible interdisciplinary activities

Once the subject-based contributions have been led by the team of teachers in the classroom, a shared Desirable Scenario is designed and agreed at the Interdisciplinary Roundtable. For example:

"Through a celebration and study, the educational community and the general public learn about the value of water from different angles and experiences, and commit to take care of it".

Once some details, approaches and scopes of the Scenario have been drafted and specified, interdisciplinary activities will be organised to celebrate and educate people about the value of water at the educational centre and/or with the community.

CELEBRATION OF INTER-AMERICAN WATER DAY - FIRST SATURDAY OF OCTOBER

1. Example of an interdisciplinary activity about water:

Main theme and focus: Celebration of Inter-American Water Day[53], with a series of activities on water in the school yard involving parents, neighbours, the community, etc. With prior agreement from the local authorities, municipalities or local mayor's office, this celebration could also be held in a nearby public square. Activities to clean and/or conserve the water table are a good idea, as they provide opportunities for learning and reflection.

Five main activities and preparatory steps:

Several main activities are proposed to celebrate this day: An innovation exhibition or competition, a water worship ceremony, games/riddles, songs and public subscription for water purposes. The activities should be preceded by agreements with the school, and involve students as well as teachers, in order to activate interest in efficient water use in the educational community and among those attending the celebration.

Details on the five activities:

1. **Exhibition**: of students' art, drawings, videos or inventions on various aspects of their interest in water, with messages about efficient use and conservation.

2. Explanation of the theme in the classrooms, promotion of a competition for the most innovative work and selection of the winners for the exhibition. Note: Awards should always be symbolic, simple and inclusive.

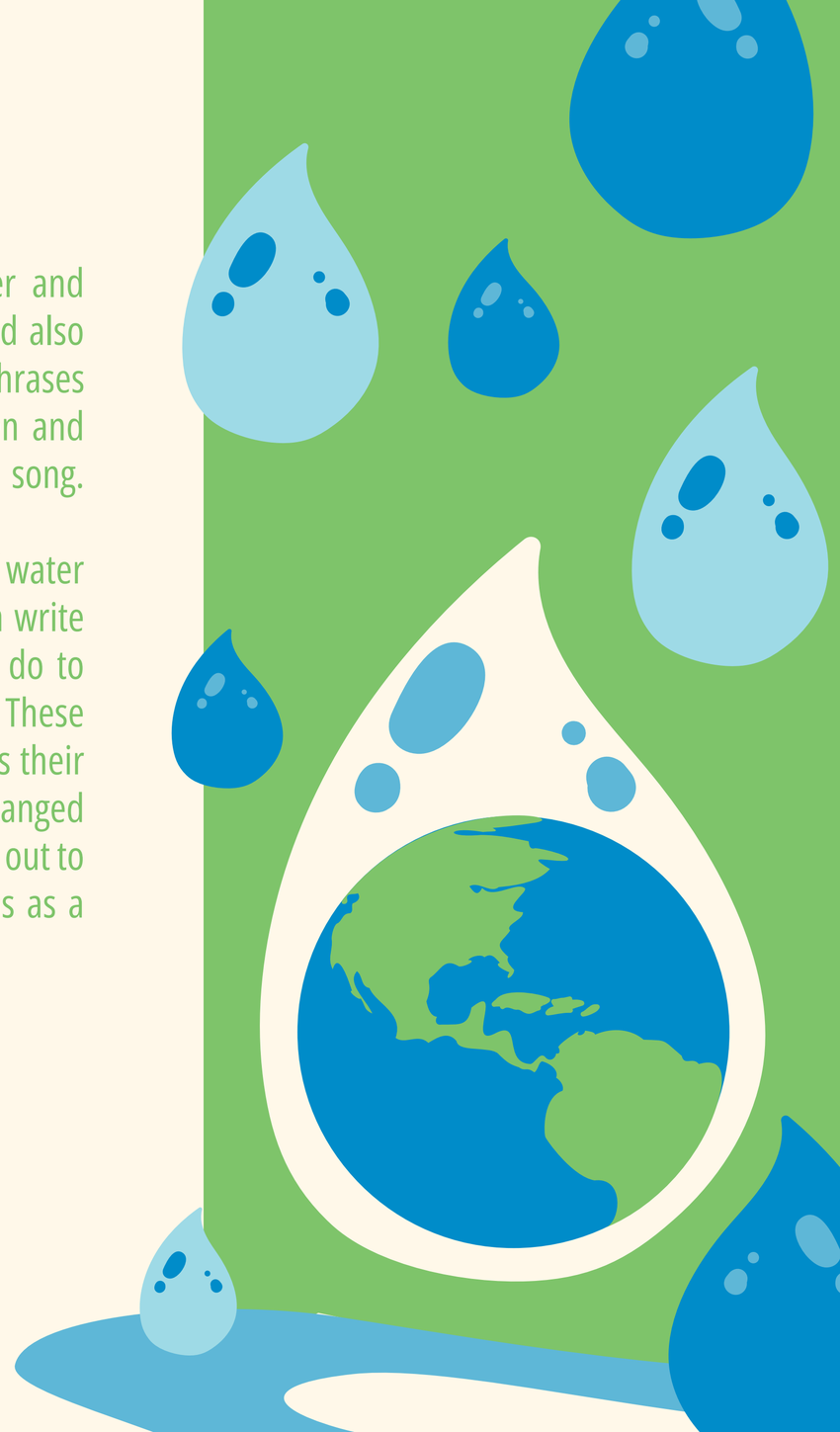
[53] Inter-American Water Day emerged as an initiative at the XXIII Inter-American Congress of AIDIS, held in Havana, Cuba in 1992. The Pan American Health Organization (PAHO), the Inter-American Association of Sanitary and Environmental Engineering (AIDIS), and the Caribbean Water and Wastewater Association (CWWA) signed the Inter-American Water Day declaration. In 2002, the Organisation of American States (OAS) joined this initiative.

3. **Water worship ceremony:** Prior student research into indigenous or local communities and their water customs, traditions, myths and ceremonies. Consultation with parents, teachers and authorities. Organisation of a public water worship ceremony based on these consultations, performed by students, with prior explanation of its symbolism and importance.

4. **Water footprint game:** Students prepare questions for visitors. Such as: Guess how much water we need to prepare a meal. They can provide samples or sell food with a low water footprint. Ask about the amount of water required for textile production by type. Provide options for efficient water use. For example, do they know the number of glasses of water they need to drink daily, its importance, and the risks of dehydration, etc.

5. **Song about water:** Choose a song about water and organise a small choir to sing it that day[54]. You could also use a simple song known locally and add a few phrases related to water. Or write a poem with the children and teachers and invent a melody to create a water song.

6. **Drops and purposes:** Cut out cardboard drops of water and give them to the students, so that everyone can write down an idea, a commitment, something they will do to use water efficiently. Glue them onto a large board. These cards are also given to the public so they can express their intentions. Then, all the commitments are read and arranged into categories, and a summary of the pledges is read out to the audience, so that they can ratify their intentions as a group.



[54] For example, a song like "Agua es..." (Water Is) which you can listen to performed by the children's choir Los Fantaschic@s at this link: https://www.youtube.com/watch?v=cDxLIMJVKg0

STUDY FOR ACTION: WHERE DOES OUR WATER COME FROM?

2. Example of an interdisciplinary water activity

Main theme and focus: This is an interdisciplinary action-study process, in which groups of teachers and students jointly investigate the source of the water consumed in school and local households, in order to raise awareness about water care, conservation and source protection.

Preparatory steps and activities:

- **Preliminary study:** A group of students ask local and regional authorities about the origin(s) of the water consumed in the locality: the drainage basin where it comes from, route and means of transportation, treatment, distribution, etc. Once the origin and further details are known, make a series of drawings and several illustrative diagrams about the subject, and exhibit them in school.

- **First conclusions:** Hold a series of meetings in the classrooms, with different teachers, to delve deeper into the source and route of the local water, as well as the state, uses and distribution of the water received (potability, appropriate uses, correct distribution to all persons or groups, etc). Come to conclusions about the overall situation, main problems and the importance of publicising the student's findings.

- **Civic campaign:** Design a simple public campaign to raise awareness of the main problems identified, among the educational community and the local population, emphasising the need for proper use of water to help its conservation and to protect its sources. Short messages, posters and/or talks on the subject will be proposed to various people, institutions, groups of neighbours, etc.

As in any campaign, the idea is to change the behaviour and attitudes of specific groups. Some questions must first be answered:

- *What is the aim of the public campaign?*
- *Who are the best target audience?*
- *What results do we expect to achieve?*
- *What are the key issues?*
- *What messages will the key issues carry?*
- *How will we broadcast the messages?*
- *How will we include suggestions?*
- *How will we follow up on the responses?*
- *How will we evaluate the campaign?*

Evaluation of the activities carried out:

The Desirable Scenario designed in the Interdisciplinary Roundtable is taken as the main reference for evaluating the activities carried out. In the case of water, the group decided: "Through a celebration and study, the educational community and the general public learn about the value of water from different angles and experiences, and commit to take care of it". Therefore, for evaluation purposes, two main results can be expected:

- The educational community is aware of the importance of the water cycle and its value in human society and natural ecosystems.
- The educational community is inspired and achieves a short, medium and long term commitment to efficient water use.

In order to evaluate the activities carried out, the group can start from four general criteria, specified through specific indicators developed in the educational centres, according to the different educational levels, ages and subjects, and based on established pedagogical approaches.

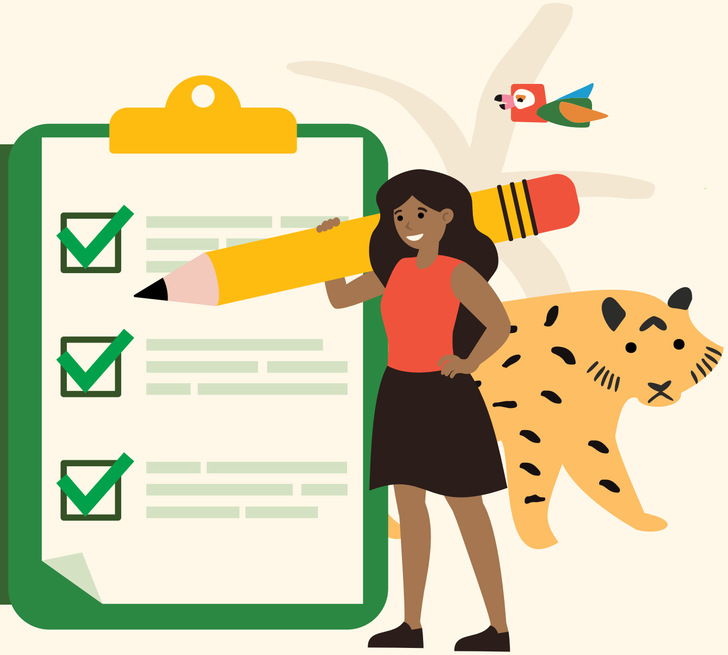
EVALUATION CRITERIA	MAIN FOCUS	CENTRAL THEME: WATER						
		ACTIVITY 1. Water Day Celebration			**ACTIVITY 2.** Study: Where does our water come from?			**COMMENTS AND PROPOSALS**
		LEVELS			LEVELS			
		HIGH	MEDIUM	LOW	HIGH	MEDIUM	LOW	
Knowledge *The value of water, the water cycle, watersheds, the water footprint.*	*Extent to which understanding of key issues has been achieved*							
Participation and interest *At the ceremony, at the exhibition, in the games*	*Level of participatory process, motivation and commitment*							
Outputs obtained *All ideas, commitments. Study for action*	*Achievement of visible, concrete results*							
Follow-up proposals *Shared ideas for further action.*	*Presence of new ideas, projects and suggestions*							

BIODIVERSITY

BIODIVERSITY

Objectives

- Raise awareness among teachers and facilitators about the importance of biodiversity and forests, for human beings and for all living beings on the planet.
- Propose subject-based contributions on these issues, as well as potential interdisciplinary activities to be carried out together with students, in schools.
- Raise awareness of the impact of human actions on biodiversity, such as the advance of the agricultural frontier, extractivism, etc.



BIODIVERSITY

The great variety of living organisms of any kind, including terrestrial, marine and aquatic ecosystems and the ecological complexes of which they form part; includes diversity within species, between species and of ecosystems.

The sustainable use of these biological resources is covered by the "Convention on Biological Diversity" (CBD)[55], an international treaty adopted in 1992, which promotes international cooperation to achieve three main objectives: the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of benefits arising from the use of genetic resources.

[55] United Nations. (1992). Convention on Biological Diversity. https://www.cbd.int/convention/

Basic concepts:

ECOSYSTEM

A dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit. Functional unit consisting of all living organisms (plants, animals and microbes) in a given area and all non-living physical and chemical factors in their environment, related by nutrient cycling and energy flow[56].

[56] Food and Agriculture Organisation of the United Nations. (2010). Guide to the application of phytosanitary standards in the forestry sector. https://www.fao.org/3/i2080e/i2080e00. html
[57] The United Nations Educational, Scientific and Cultural Organisation. (2001). UNESCO Universal Declaration on Cultural Diversity. http://portal.unesco.org/es/ev.php-URL_ID=13179&URL_DO=DO_TOPIC&URL_SECTION=201. html
[58] Ramsar Convention. (2014). Bio-cultural Diversity | Ramsar. The RAMSAR convention secretariat. https://www.ramsar.org/activities/bio-cultural-diversity
[59] Food and Agriculture Organisation of the United Nations. (2012). Guide to the application of phytosanitary standards in the forestry sector. https://www.fao.org/3/i2080e/i2080e00. html

CULTURAL DIVERSITY

Existence of a variety of cultures interacting and living in a shared territory or geographical space. In this context, cultures are the knowledge, practices, beliefs and traditions that characterise different human groups. Culture takes diverse forms across time and space. This diversity is embodied in the uniqueness and plurality of the identities of the groups and societies making up humankind[57].

BIO-CULTURAL DIVERSITY

This is the continuing co-evolution and adaptation between biological and cultural diversities. It also involves the diversities of place and reflects people's ways of living with nature[58].

FORESTS

A biological community of plants and animals which is dominated by trees and other woody plants[59] Terrestrial ecosystems in tracts of a given territory, generally home to certain varieties of trees and shrubs, as well as various species of fauna and flora. **Forests generate oxygen and absorb carbon dioxide. They are very important for life.**

Basic concepts:

PROTECTED NATURAL AREAS

Zones of terrestrial or aquatic territory that are created to conserve biodiversity, and also for the purpose of maintaining ecological processes fundamental to life. IUCN defines a protected area as "A clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values."[60]

They stand out for the variety and characteristic nature of their fauna and flora. Usually, countries create national systems of protected areas that include places declared of special interest.

ECOSYSTEM SERVICES

The direct and indirect benefits society obtains from ecosystems and uses for human well-being[61]. These benefits depend on the ecosystem's proper functioning. Therefore, a detrimental alteration would diminish the benefits it provides. Environmental awareness and preservation play an important role here, as ecosystems improve people's quality of life.

BIOLOGICAL CORRIDORS

Areas established in order to reduce the negative effects of species habitat fragmentation through "biological connectivity" to maintain the functional processes and environmental services ecosystems provide. The word "corridor" is used to express that such territory or space facilitates the movement of living beings through habitats (or other elements or processes of interest) that connect two or more places, in which they find suitable conditions.

[60] Dudley, N. (2008). Guidelines for Applying Protected Area Management Categories. IUCN.
[61] MEA. (2005). Millennium Ecosystem Assessment. www.millenniumassessment.org/

Our connections with biodiversity and forests

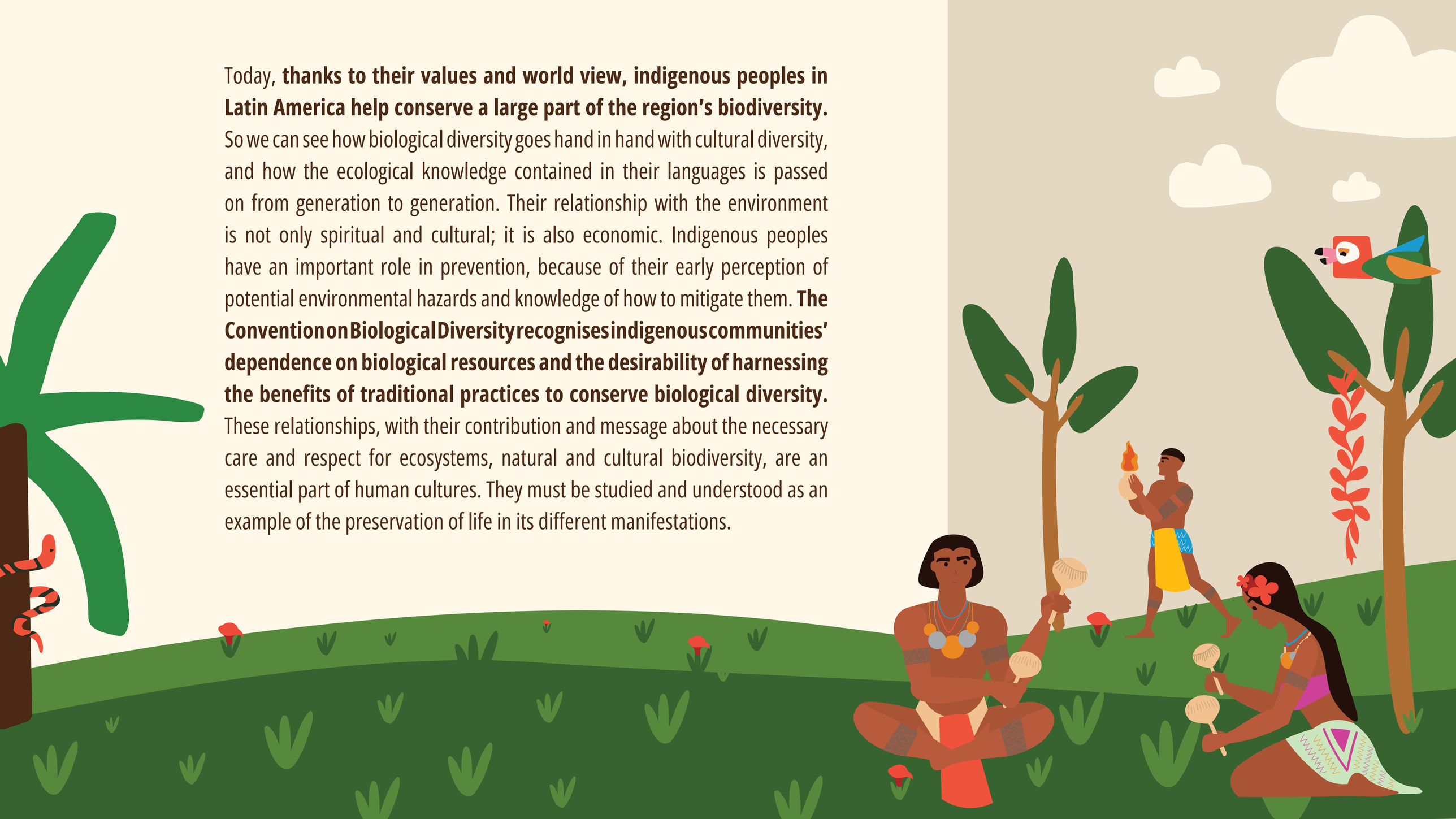
When human beings walk through a forest we feel a closeness, a vibration, that reminds us that we are really part of nature. The sounds, the rustle of dry leaves under our feet, bird song, all soothe us and bring us peace. **Contemplating a river, a gently flowing stream, gazing at the sea, hugging a tree are all moments that transport us to our inner self and allow us to “tune in” to the natural world.** Nature gives us a wonderful harmony when we know how to contemplate and appreciate it.

We have harnessed genetic variability and “domesticated” various species such as maize, beans, pumpkins, etc. through artificial selection and modification. These varieties and their related processes, as well as the oral traditions that promote or sustain them, are also part of cultural biodiversity. Humans also have an important economic and social relationship with ecosystems, especially forests, through ecosystem services. This relationship is diverse. **Trees and their fruits are an important resource in many social and economic activities.** Forestry is about using the natural timber and non-timber resources of a wooded area, and this can be done sustainably, with the necessary care. One of the threats of unsustainable extraction is deforestation, which leads to the elimination of forested areas and increases soil degradation.

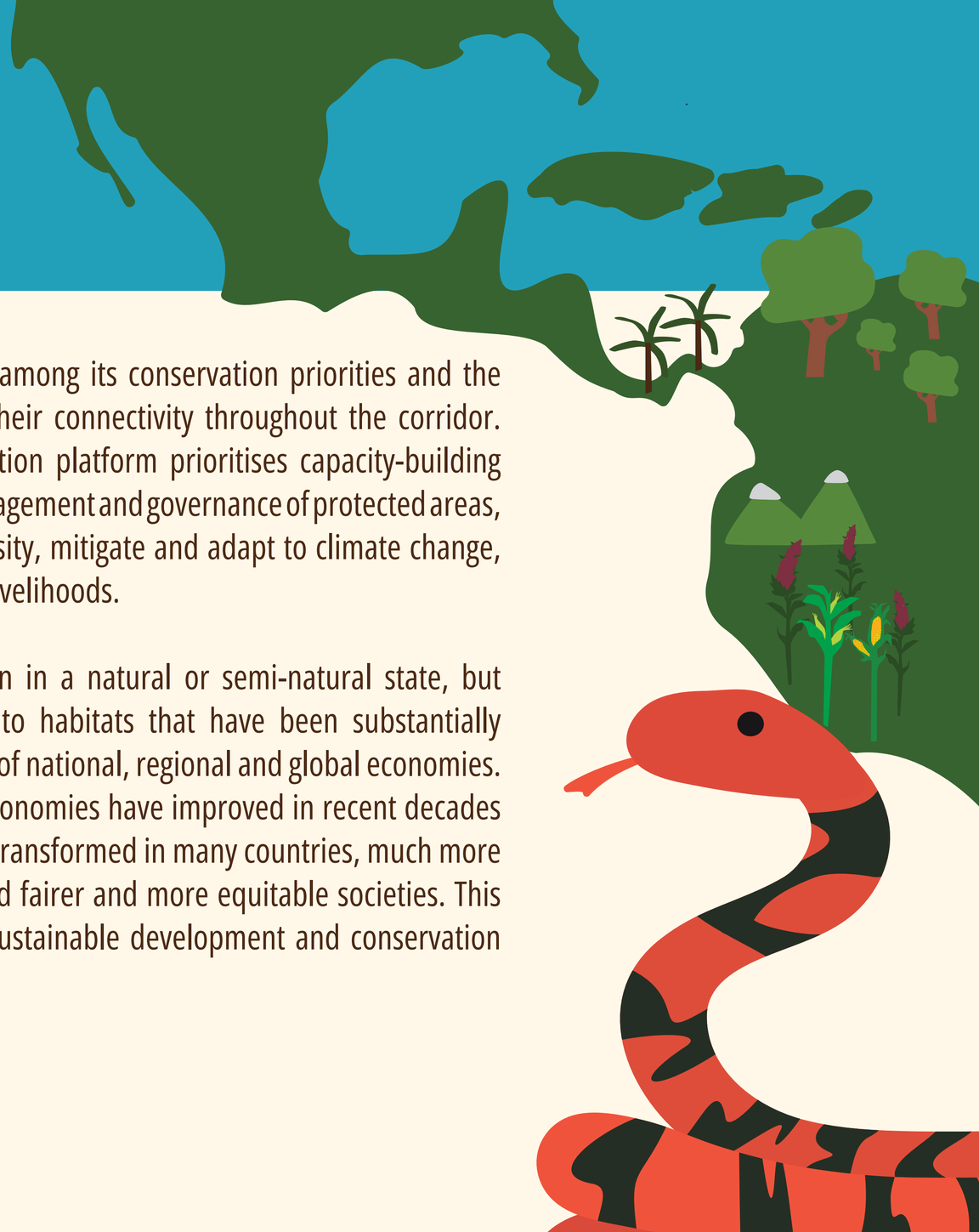
Forest and landscape restoration is essential. These processes are becoming increasingly important as our social and economic relationships with biodiversity and forests are inadequate. Ecotourism, or nature tourism, can support conservation processes and community activities related to natural spaces and protected areas if properly designed.

And different cultures have and continue to maintain a series of connections with the forest. Ancestral stories or legends often aim to protect the forest and its inhabitants. According to various indigenous peoples’ world views, forests are inhabited not only by diverse animals and plants, but also by deities or spirits, who sometimes appear to inform or warn the communities. Many local people tell of experiencing apparitions or sensations when going into the forests, at night, in areas with special vegetation, or at times when they intended to make inappropriate use of plants or animals. There is a link between cultures and the environment that encourages its protection. Therefore, customs are based on this principle of conserving the land as an essential part of our environment.

Today, **thanks to their values and world view, indigenous peoples in Latin America help conserve a large part of the region's biodiversity.** So we can see how biological diversity goes hand in hand with cultural diversity, and how the ecological knowledge contained in their languages is passed on from generation to generation. Their relationship with the environment is not only spiritual and cultural; it is also economic. Indigenous peoples have an important role in prevention, because of their early perception of potential environmental hazards and knowledge of how to mitigate them. **The Convention on Biological Diversity recognises indigenous communities' dependence on biological resources and the desirability of harnessing the benefits of traditional practices to conserve biological diversity.** These relationships, with their contribution and message about the necessary care and respect for ecosystems, natural and cultural biodiversity, are an essential part of human cultures. They must be studied and understood as an example of the preservation of life in its different manifestations.



Context in Latin America and the Caribbean



The countries of Latin America and the Caribbean (LAC) are home to great biological diversity. The region accounts for 31-50% of mammal, bird, reptile, amphibian, plant and insect species (UNEP, 2011). Their ecosystems are very diverse, and include wetlands, marine-coastal ecosystems, deserts, tropical forests, savannah grasslands and high altitude Andean habitats. **Six of the ten most biodiverse countries in the world (Brazil, Colombia, Ecuador, Mexico, Peru and Venezuela) are found in this region, along with the most biodiverse area on the planet: the Amazon rainforest.**

Located in a priority biodiversity area, the Caribbean Biological Corridor (CBC) is a regional governance and coordination platform based on a common strategy that contributes to the effective conservation of biodiversity, the maintenance of ecological connectivity and the provision of ecosystem services at key sites in the Caribbean. The CBC includes species, ecosystems, core conservation areas and ecosystem connectivity areas in its conservation activities. Wet forests, dry forests and xeric shrublands are among its conservation priorities and the project works to ensure their connectivity throughout the corridor. This South-South cooperation platform prioritises capacity-building actions to improve the management and governance of protected areas, reduce threats to biodiversity, mitigate and adapt to climate change, and promote sustainable livelihoods.

Large areas of LAC remain in a natural or semi-natural state, but the region is also home to habitats that have been substantially transformed in the service of national, regional and global economies. Although some national economies have improved in recent decades and governance has been transformed in many countries, much more progress is needed to build fairer and more equitable societies. This is a challenge for future sustainable development and conservation trajectories in the region.

Biological corridors play an important role in the care and conservation of biodiversity and forests in the region, and are also related to natural protected areas. For example, sustainable forest management in the case of two protected areas connected by a region of unprotected forest allows the composition and structure of the forest ecosystem to be maintained while preserving connectivity, rather than transforming it into cultivated areas that would be barriers for some species. Species flow is related to the degree of modification of the original ecosystems.

In 2010, 20 Aichi Biodiversity Targets were adopted in the framework of the Convention on Biological Diversity (CBD)[62]. The worrying situations mentioned in the report [63] include the decline in species abundance and risks of extinction; pressures related to rapid economic growth and social inequalities; expansion and intensification of agriculture to increase areas for livestock; development of road and dam infrastructure, etc. There are also some positive trends: efforts to control illegal wildlife trafficking; the significant expansion of some protected areas; the implementation of management and recovery programmes for some species, among others.

More recently, the **Regional Assessment Report on Biodiversity and Ecosystem Services for the Americas64 showed the status of biodiversity and ecosystem services, considering both their present and future threats, as well as their benefits for quality of life in each sub-region, considering their specific characteristics and distinct biophysical conditions.**

The report notes that most studies indicate that terrestrial systems in **South America, Africa and parts of Asia will be much more affected by biodiversity loss than other regions,** especially in scenarios that are not based on sustainability objectives. It also indicates that while the rate of agricultural expansion in intact ecosystems has varied between countries, losses mainly occurred in the tropics, where the highest levels of biodiversity on the planet are found (e.g. 100 million hectares of tropical forest were lost between 1980 to 2000), due to cattle ranching in Latin America (approximately 42 million hectares) and plantations in South-east Asia (approximately 7.5 million hectares, 80% of which is for palm oil). These are all important aspects that need to be taken into account in biodiversity management processes in the region, in order to direct them towards conservation and sustainability.

[62] United Nations Environment Programme (UNEP). (2011). Strategic Plan for Biodiversity 2011-2020. https://www.cbd.int/doc/strategic-plan/2011-2020/Aichi-Targets-EN.pdf
[63] The State of Biodiversity in Latin America and the Caribbean. United Nations Environment Programme. (2016). A Mid-Term Review of Progress Towards the Aichi Biodiversity Targets https://www.cbd.int/gbo/gbo4/outlook-grulac-en.pdf
[64] The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES). (2018). The Regional Assessment Report on Biodiversity and Ecosystem Services for the Americas. https://ipbes.net/assessment-reports/americas

Thematic contributions

Mathematics:

- Carry out some simple calculation exercises, to check your results, using names of plants, animals or trees typical in the area. For example, select a flower (F), a bird (B) and a tree (T) using these operations:

  a. **B + B + B = 27; b. F + B + F = 19; c. F + T + T + T = 13; d. F X B - T =?**

- Explain how the first Mayan peoples invented zero, an expression of cultural diversity and their mathematical knowledge. Analyse their concept, which indicates absence (as in maths), and also completeness. The Mayan numbering system is considered very complete, ranges from 0 to 19, and is related to their knowledge of astronomy and calendars. It is written using dots and dashes, a dot equals 1, and a dash equal 5. Example: the number 12

Natural Sciences:

- Define the general characteristics of protected areas and explain their importance. Identify the types of protected areas in your country and region. Explain the characteristics of the nearest protected area. Establish the differences between forests with native trees or introduced species. Describe the potential impacts on local fauna and flora, and their cause.

- **Examples and explanation of fractals. Study and simply present the Koch Curve, or "snowflake", which allows proper understanding of fractals as an expression of the connection between mathematics, natural science and natural forms. Show students images of flowers or parts of leaves with clear fractal shapes.**

Example

Language and Literature:

- Identify and recognise the language of a native community that lives near the school or in a known location. Explain their importance, the need to preserve it and how this language and native community are related to national cultural diversity.

- **Find a story by a Latin American or Caribbean author about forests, such as La Sirena del Bosque (The Mermaid in the Forest) by Ciro Alegría, dedicated to the Amazonian Ceiba pentandra tree. Analyse the story and encourage students to write their own tale referring to aspects of biological and/or cultural diversity.**

Example

Social Sciences:

- Identify and value the contribution of indigenous peoples to forest conservation and their connection to cultural diversity. Encourage proposals to improve their current situation in order to generate environmental and social awareness. Relate their story to national and local history and the various actions aimed at protecting the forests.

- **Study and analyse the migrations of some native communities in the region, and how these are related to forest loss. Learn where Afro-descendant communities are located**

Example

Desde las Artes:

- Organise a series of opportunities to listen to music related to the songs or calls of endemic national or regional animals. Explain the relationship between the vibration of some instruments with the vibrational frequencies of these sounds, and the meaning of the calls.

- Invite students to paint imaginary forest scenes, emphasising the variety of tones and colours as part of biological diversity. Nature is much more than green.

- From a musical point of view, wooden instruments can be analysed to show how sounds are generated, for example, the infinite range of wooden flutes. Or traditional wooden instruments, such as the marimba.

- Ask students to record the sound of a nearby park or forest and evaluate the sounds of the forest and the different musical interactions it creates. Note differences and similarities between the different recordings. Note the rhythms they create and find songs or instruments inspired by the forests.

Physical Education:

- Run a race pretending that the participants are different animals, e.g. birds, with wings of different sizes, establishing the importance of initial thrust and the strength and speed of flapping during the race.

- Perform outdoor activities in green spaces with different species of flora and fauna that are a source of physical and mental health. Seeing nature as a source of heath encourages conservation.

- **Perform gymnastic exercises that imitate the movements of regional or national animals (monkeys, snakes, condors, etc.) and the shapes of tree branches. For example: Some yoga poses are named after animals, and invite us to balance body and mind.**

Potential interdisciplinary activities:

Once the subject-based contributions have been led by the team of teachers in the classroom, a shared Desirable Scenario is designed and agreed at the Interdisciplinary Roundtable. For example:

"The educational community and the general population come to value biodiversity, cultural diversity and forests, through direct experiences and shared actions".

Once some details, approaches and scopes of the Scenario have been drafted and specified, interdisciplinary activities are organised at the educational centre and/or with the community.

FIELD TRIP TO A RESERVE OR AREA OF NATURAL AND CULTURAL INTEREST

1. Example of interdisciplinary activity on biodiversity, cultural diversity and forests

Main theme and focus: Take groups of students on a guided and participatory tour of a natural area of interest (conservation area, forest, or if not possible, at least a park with trees, plants, birds, etc). In a Covid context, it would be interesting to identify forest loss by comparing photos from previous years and the current picture. In addition, pollination and agricultural production could be observed to address everyday issues such as food security.

Main activities and preparatory steps:

1. **Preparatory phase:** As an interdisciplinary group of teachers, select the most appropriate place for the field trip considering: a. proximity, b. specific features of the biodiversity and forests, c. ease of access for students and guides, etc. Once the location has been decided, the group studies its history, related research, main species of flora and fauna, existing problems, relations with nearby communities, etc.

2. **Pre-organisational phase:** As a second teachers' group activity, a preliminary visit to the site was carried out to design the route to follow with the students. This route should include at least the following main aspects: a. start (starting point, entrance), b. sequence or initial walk, to take approximately 5-7 minutes, c. important places to stop and observe, d. large places to rest, feel and share experiences, e. route to continue to the areas of greatest interest, f. return route, considering new areas for observation, g. arrival back at the entrance, selection of a space to take stock and gather final reflections.

3. **Preparation of students:** Students and parents are informed about the field trip to the selected location. A list of recommendations to help them prepare should be drawn up, such as:

- *carry a vacuum flask with water for the walk*
- *wear comfortable clothing and suitable footwear*
- *use sunscreen and a wide-brimmed hat if exposed to high solar radiation*
- *carry a notebook, for note-taking and/or drawing*
- *a light waterproof in case of rain*
- *The use of mobile phones for educational purposes is recommended, such as: downloading apps to identify plants, encouraging students to take photos of flora or fauna, create group videos on specific topics, etc.*

In order for minors to be able to carry out the activity independently, the necessary family authorisation formalities must also be carried out.

4. **Preparation of the team of teachers/guides:** Once the pre-organisational phase has been defined and the route is clear, the teaching team must prepare messages and activities for each stage, distributing their contributions evenly. They could also be accompanied by a parent who knows the place or wishes to support the group. It is important to carry water, appropriate footwear, waterproofs and a first aid kit, taking the safety protocols for student trips and MINEDUC Ministry of Education guidelines into account.

5. **Types of messages and activities:** In defining the stages, the group needs to come up with a few specific messages and activities for each stage. For example:

- ***Activities at the entrance:*** Messages: organisation, respect, sharing, enjoyment. The group of students meet their guides and other invited participants. They are given a brief explanation of the site to be visited (its history, importance for biodiversity, links to cultural diversity, relations with neighbouring communities, etc). They are reminded of all the safety measures (previously discussed at school). The need for silence and respect throughout the journey is underlined. It is also important to remember the importance of notebooks, for writing down their impressions or experiences. Ask for a minute of calm and silence to reflect as a group on what everyone is about to share, and to thank nature for this opportunity. End with a group hug and a final round of applause, for an excellent day.

- ***Activities for the initial walk:*** Message: let's feel - our senses and the forest. Shortly after beginning the walk, participants are asked to stop and listen (listen, identify each of the sounds, write impressions down in the notebook). A little further on, everyone is invited to gently approach a tree and touch its bark (feel, touch, empathise with the tree, note sensations, embrace the tree and give thanks).

Then note impressions down in the notebook and continue. As you carry on walking, stop again to look around you and observe and the landscape from various positions: standing looking up, crouched down looking at the ground, lying on the ground, looking up, etc. Note what you see in the various positions. Go a bit further and stop to smell the air coming from the plants and soil, take a deep breath and note it down.

- ***Activities to stop and observe at important sites:*** Message: Let's learn about the species of flora and fauna we see. The guides explain the different plants found at the site, their relationship with some species of fauna and the importance of conserving them. Details on environmental issues. Questions, concerns, etc. will be answered. Students will be asked about what they define as sustainable and unsustainable use of biodiversity. Observe each or some species, area of activity, or life directly. Discuss the ancestral use of some of the plants and their link to local culture.

- ***Activities in spacious places to reflect and feel:*** Message: how we saw or felt what happened so far. The group stops at the selected location for a reflective break. They drink water and rest. Invite everyone to share what they wrote down or drew in the various places. Compare similarities and differences, and invite them to notice what aroused most interest, what they liked most, what they were concerned about.

- ***Activities on the return route:*** Message: Let's examine problems and think of solutions. Take a good look at the way you came as you walk back. Are there traces of human activity (bottles, paper, etc.) What impact might these activities have on biodiversity? Are any trees or plants drying out, etc? Are there signs of flowers or branches being uprooted, etc? Write down what you observe in order to be able to come up with solutions as a group.

- ***Completion activities:*** Message: Let's celebrate the experience and think about sharing it. Hold a meeting to take stock of the group's observations and experiences when you reach the end. Read out some of the notes and show some of the drawings, comparing the themes and looking for alternatives to allow the group to turn everything learned and experienced into a campaign to protect the place visited.

At the end of the meeting, the group thanks each other for the experience and shares a group hug and a final round of applause. Agree on the next meeting at the educational centre to plan an awareness-raising activity.

PRODUCTION OF A WALL NEWSPAPER ON BIODIVERSITY, CULTURAL DIVERSITY AND FORESTS

After the field trip, a meeting between the group of students, guides and other participants is held. An interdisciplinary group of teachers interested in contributing to the process is also invited. Propose creating a monographic wall newspaper, social network posts or a module on Biodiversity, Cultural Diversity and Forests to achieve wider reach.

Steps needed to produce the monographic wall newspaper:

A wall newspaper is a means of communication that is produced, in this case, in an educational centre, and placed, where possible, on a wall display, so that it can be easily read. It could also be mounted on a folding screen, which can be moved about and offers two sides for display.

The school may already have a wall newspaper, but this one is to be monographic, i.e. dedicated to specific topics learned on the field trip that are transcendental for life and the sustainable development of the community, the village/town/city and the country. Consider the following steps when preparing the monographic wall newspaper:

1. Define **the objectives**, for example, to raise awareness of the importance of the place visited, its biodiversity, forests, cultural role, etc. Also raise awareness of the need to preserve such natural sites. Agree on who will be **directly responsible for and who will work on** the newspaper, in order to achieve coherent and interesting content to share with the school and visitors.

2. Define **the title** of the wall newspaper, in line with the desired theme and approaches. Define the **typeface, colours, symbolic images**, etc.

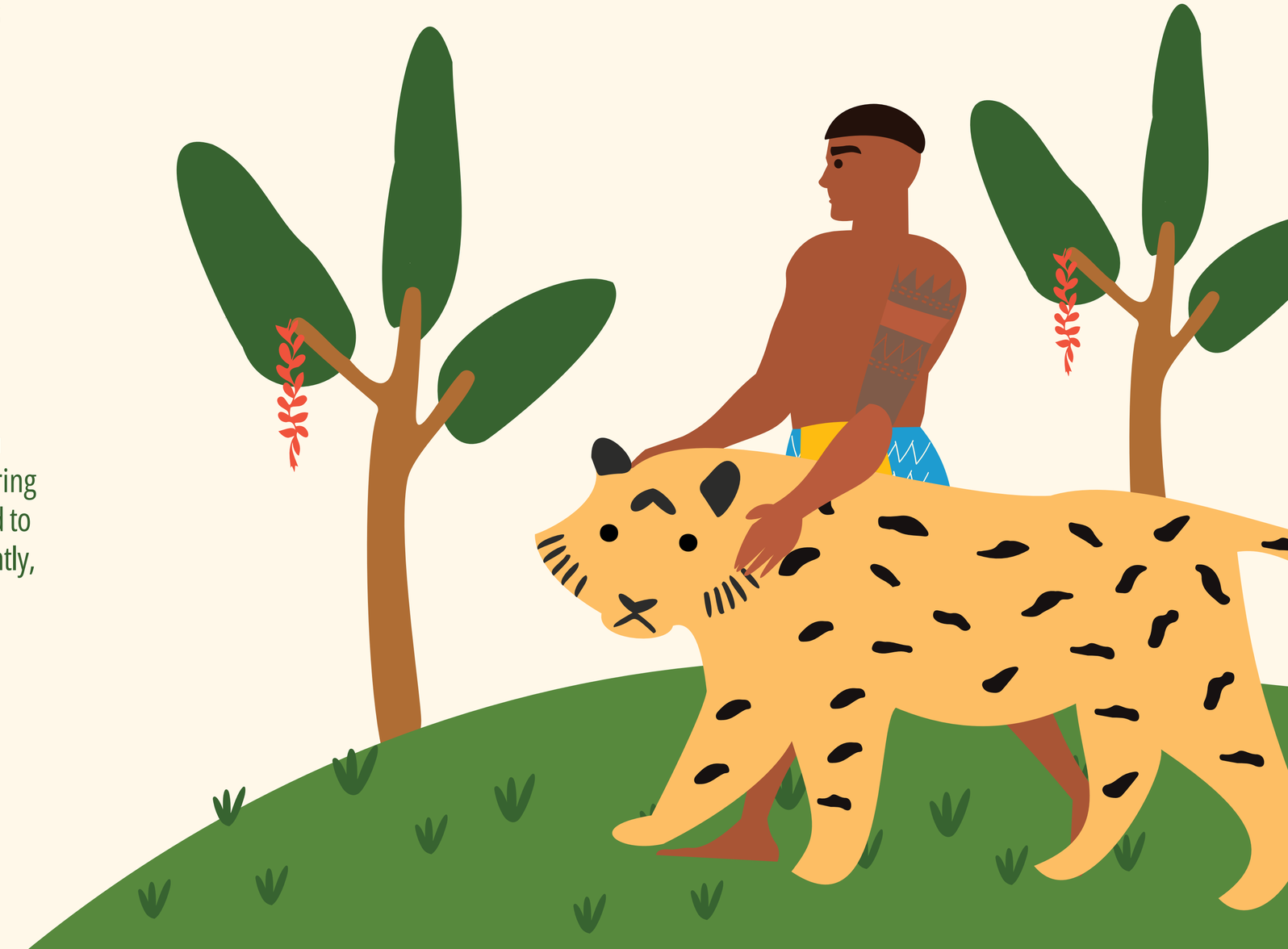
3. Establish a space for the **Editorial** introducing the topic(s), the intention and content highlights.

4. Agree on the **main sections** of the newspaper, e.g. 3 core sections: Biodiversity, cultural diversity, forests. And also a News section. You could also include cartoons, jokes or gags.

5. Define the main **content and messages** to start with, considering sequence and variation.

6. Open a **Suggestions** section, to give people who read the newspaper a space where they can propose themes, content or ideas for action.

You could also use the wall newspaper to invite students to volunteer for reforestation. A volunteer community reforestation project could be planned, starting with obtaining seeds or acquiring seedlings or saplings of native species. This activity can be related to the care and reforestation of parks or surrounding areas. Subsequently, plan follow-up visits to take care of the trees planted.



Evaluation of the activities carried out

The Desirable Scenario designed in the Interdisciplinary Roundtable is taken as the main reference for evaluating the activities carried out. In the case of biodiversity and forests, this scenario was: "The educational community and the general population come to value biodiversity, cultural diversity and forests, through direct experiences and shared actions".

Therefore, for evaluation purposes, two main results can be expected:

- *Education community values biodiversity, cultural diversity and forests*
- *Activities achieve a good response in shared experiences and actions*

In order to evaluate the activities carried out, the group can come up with four general criteria, which can be refined through specific indicators developed in educational centres for the different educational levels, ages and subjects, and based on established pedagogical approaches.

EVALUATION CRITERIA	MAIN FOCUS	CENTRAL THEME: BIODIVERSITY AND FORESTS						
		ACTIVITY 1. Field trip to a natural area			**ACTIVITY 2.** Production of a wall newspaper			**COMMENTS AND PROPOSALS**
		LEVELS			LEVELS			
		HIGH	MEDIUM	LOW	HIGH	MEDIUM	LOW	
KNOWLEDGE *Biodiversity, cultural diversity, forests, protected natural areas*	*Extent to which understanding of key issues has been achieved*							
PARTICIPATION, INTEREST *Active involvement during the different moments of the field trip Development of and commitment to the wall newspaper*	*Level of participatory process, motivation and commitment*							
OUTPUTS OBTAINED *Field trip route designed. Wall newspaper designed and presented.*	*Achievement of visible, concrete results*							
FOLLOW-UP PROPOSALS *Suggestions received after both activities.*	*Presence of new ideas, projects and suggestions*							


SOIL

SOIL

Objectives

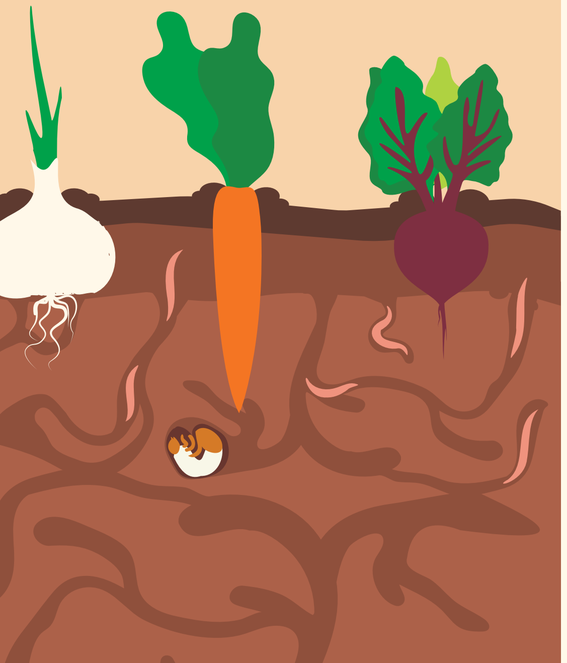
- Raise awareness of the importance of soil for human life and the life of all beings on the planet, as an organic substrate for organic agriculture and for environmental conservation.
- Share analyses and applications with students at the educational centre.

SOIL

The Food and Agriculture Organisation of the United Nations (FAO) defines soil as a thin layer formed very slowly, over hundreds of years, by the disintegration of surface rocks caused by the action of water, temperature changes and the wind. Plants and animals that grow and die in and on the soil are decomposed by micro-organisms, transformed into organic matter and mixed with the soil.

Soil provides numerous nutrients, water and minerals for plants and trees, and is home to billions of insects, small animals, bacteria and many other micro-organisms. Thousands of life forms multiply in the soil, most invisible to our eyes, so that a spoonful of soil can contain a million bacteria, as well as hundreds of thousands of yeast cells and tiny fungi. However, **the amount of fertile soil on the planet has been declining at a rate that is already considered alarming,** compromising farmers' ability to grow food for a world population expected to reach nine billion by 2050.

Conceptos básicos:



EROSION

Wear, dragging and loss of soil particles. Erosion is caused by the action of water and wind on unprotected areas: it removes particles and nutrients from the soil and transports them to other areas, depending on the environment. Soil erosion is defined as a process of disaggregation, transport and deposition of soil materials by erosive agents (Ellison, 1947). In the case of water erosion, rainfall and surface run-off or flooding are dynamic erosion agents.[71]

DESERTIFICATION

The FAO defines desertification as the set of geological, climate, biological and human factors that lead to the degradation of the physical, chemical and biological quality of soils in arid and semi-arid zones, endangering biodiversity and the survival of human communities.

CROP ROTATION

Sowing different crops on the same piece of land in successive years. Crop rotation is a conservation agriculture technique. A varied crop rotation is necessary to avoid pests and diseases and to improve soil conditions.[72]

CROP ASSOCIATION

Sowing different plant species in the same year. **Planting different crops together reduces pest problems and makes efficient use of soil nutrients.** Legumes (e.g. beans, soybeans) provide nitrogen to other crops such as maize and tomatoes when planted together. Some plants such as peppers and garlic can repel pests from neighbouring crops. These and other plant combinations can be mixed in or around the planting area [73].

FOOD SECURITY

The availability of food, and ensuring that people can access the food available (such as by having the money to buy food), that the food is sufficient and nutritious so that the body can get the energy and nutrients it needs for a healthy life in a stable and continuous way. At the level of the individual, the household, the nation and globally, food security is achieved when all people have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and preferences for an active and healthy life at all times. [74]

[71] P. Wildner and M. da Veiga (2017). Erosión y pérdida de fertilidad del Suelo (Erosion and Loss of Soil Fertility). https://www.fao.org/3/t2351s/T2351S06. htm

[72] Food and Agriculture Organisation of the United Nations. (2021). Conservation Agriculture Principles: Conservation Agriculture: Food and Agriculture Organisation of the United Nations. https://www.fao.org/conservation-agriculture/overview/conservation-agriculture-principles/en/

[73] Food and Agriculture Organisation of the United Nations. (2015). Building on traditional gardening to improve household food security. https://www.fao.org/3/X0051t/X0051t02.pdf

[74] Special Programme for Food Security - SPFS - Central America. (2011). Seguridad Alimentaria y Nutricional: Conceptos Básicos (Food Security and Nutrition: Basic Concepts). http://www.fao.org/3/a-at772s.pdf

Conceptos básicos:

FOOD SOVEREIGNTY

Peoples' right to define their own policies and strategies for the sustainable production, distribution and consumption of food that guarantee the right to food for the entire population, on the basis of small and medium-sized production, respecting their own cultures and the diversity of peasant, fishing and indigenous forms of agricultural production, marketing and management of rural areas, in which women play a fundamental role. (Conclusions of the World Forum on Food Sovereignty. Havana, Cuba, September 2001) [75]

AGROECOLOGY

Agroecology is a scientific discipline, a set of practices and a social movement. As a science, it studies how the different components of the agroecosystem interact. As a set of practices, it seeks sustainable farming systems that optimise and stabilise yields. As a social movement, it pursues multifunctional roles for agriculture, promotes social justice, nurtures identity and culture, and strengthens the economic viability of rural areas.

AGROFORESTRY

Agroforestry is the collective term for land-use systems and technologies in which woody perennials (e.g. trees, shrubs, palms or bamboos) and agricultural crops or animals are used deliberately on the same parcel of land in some form of spatial and temporal arrangement. Agroforestry can also be defined as a dynamic, ecologically based natural resource management system that, through the integration of trees on farms and in agricultural landscapes or through the production of agricultural products in forests, diversifies and sustains production for increased economic, social and environmental benefits for land users.[77]

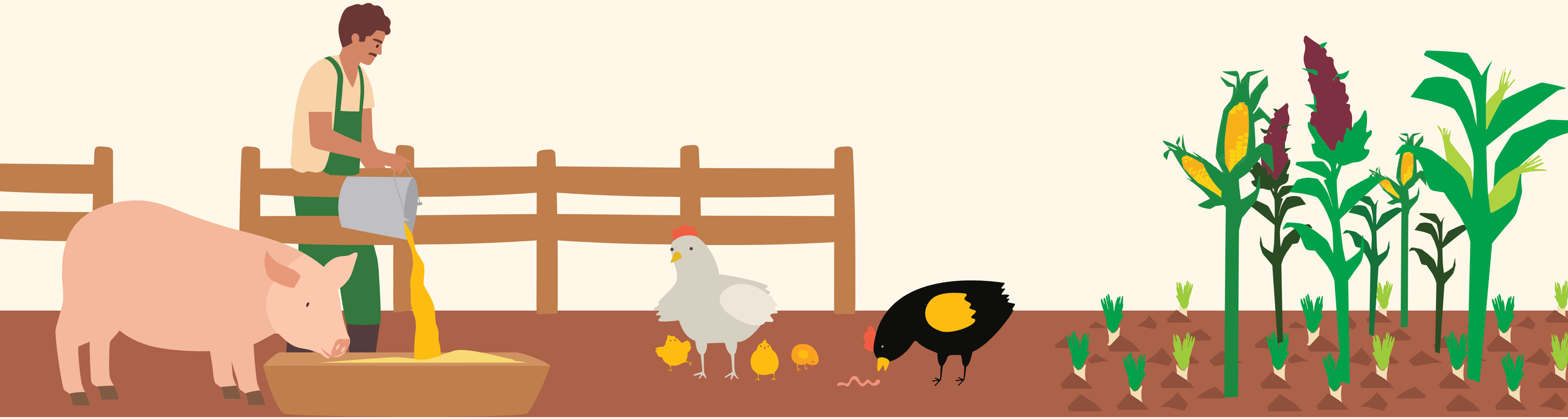
Agroforestry originated in the ancestral cultures of Latin America. Their main source of food income was and will continue to be the forest and agriculture. **Agroforestry techniques and practices improve the physico-chemical conditions of the soil and make rational use of natural resources.**

[75] Food and Agriculture Organisation of the United Nations. (2011). Basic Concepts | Special Programme for Food Security (SPFS). https://www.fao.org/in-action/pesa-centroamerica/temas/conceptos-basicos/es/
[76] Food and Agriculture Organisation of the United Nations. (2021). Family Farming Knowledge Platform https://www.fao.org/family-farming/themes/agroecology/en/
[77] Food and Agriculture Organisation of the United Nations. (2021). Sustainable Forest Management (SFM) Toolbox https://www.fao.org/sustainable-forest-management/toolbox/modules/agroforestry/basic-knowledge/en/

Our connections with soil

The word soil comes from the Latin solum meaning floor, earth, territory. The words “soil”, “earth”, “mother earth”, express our natural and cultural relationship with the planet. Soil feeds, reproduces, transforms and can degrade.

When someone walks barefoot on the grass, they feel a very special, vibrational connection. They feel a sense of vital closeness, of direct connection, confirming we are indissolubly linked to the Earth and to this soil on which we live and which provides us with the resources to sustain life. Walking on a sandy beach also produces a feeling of well-being, of closeness at the touch on the soles of the feet, or in the hands when you gently stroke a palm over the sand, all this is a sign of our vibratory and natural communion.



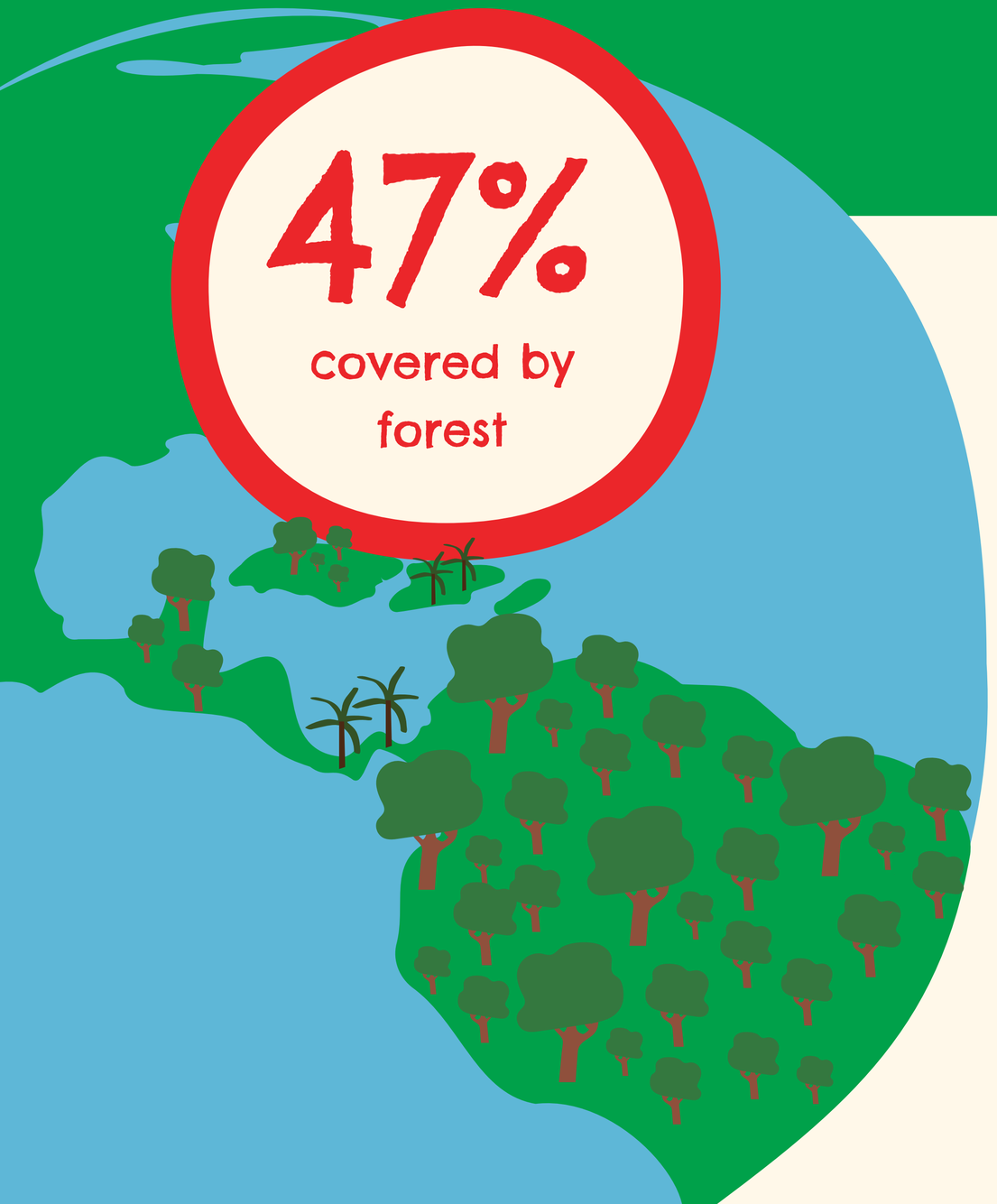
Agriculture is our clearest social and economic relationship with the soil. Food is produced on a daily basis and its socio-economic benefits are a vital social connection. It represents not only a guarantee of survival, but also integrates the various creative and cultural forms that emerge during cultivation processes.

Cultivate, is a word related to the concept of culture, it has links with social care, with breeding and with the various ways of working the land to obtain agricultural products (food). Cultivation reveals a cycle comprising different processes. These include sowing, planting, tilling and harvesting, which have a sequence and require follow-up.. The concept of cultivation gives rise to the importance of and social respect for soil. **We need to avoid its contamination and degradation (use of toxics, intensive agriculture) as this could affect the cultivation process and therefore our health.**

“Pachamama” is the Quechua word for Mother Earth. It is now part of our understanding and respect for the soil and the earth.

Numerous ceremonies of thanksgiving, organised and maintained by various communities in the region, show the existence of a kind of universal protection that comes from Mother Earth, allowing life to exists, through food and water. Each tribute is, in itself, a form of respect and care, it arises from a distinct world-view that has transcended time and continues to express and underline that we owe our lives to the earth, that we are part of it, and that, consequently, our activities need to be analysed and directed in the best way, for the common good.

Context in Latin America and the Caribbean



Latin America and the Caribbean have the world's largest arable land reserves[78]. About 47% of the land is still covered by forest, but this figure is declining rapidly as a result of the expansion of agricultural land. Over the last 50 years (1961 - 2011), the region's agricultural area has increased significantly, from 561 to 741 million hectares, especially in South America where expansion was greatest: from 441 to 607 million hectares.

[78]Food and Agriculture Organisation of the United Nations. (2015). Soil and water conservation in Latin America and the Caribbean. https://www.fao.org/americas/priorities/suelo-agua/en/

The expansion of production has generally been accompanied by intensive input use, soil and water degradation, biodiversity reduction and deforestation. This land use operates under a market logic that not only jeopardises the quality and availability of natural resources but also people, particularly the most vulnerable people's way of life, such as the indigenous peoples and communities dependent on natural ecosystems.

Medium-sized producers have tried intermediate or advanced technologies in the region, adapting several to the particular conditions of each place. **Through their experience, local farmers, indigenous or mestizo producers, have accumulated knowledge about the properties, functioning and management of natural resources.**

In Latin America, there must be greater recognition of communities' agricultural practices and local knowledge. Local soil knowledge based on perception, classification and use should be a resource used to improve land use and management practices. These can support the design of new agro-ecosystems with greater market potential, while preserving the ecological advantages of traditional systems. Of course, this knowledge can be complemented by technical studies.

Thematic contributions

Mathematics:

- Explain the general characteristics and mathematical meanings of, for example, quipus[82], as a cultural form of accountancy in social, agricultural, etc. processes. Highlight other historical links between mathematics and the region, country and village/town/city's various cultures.

- Carry out exercises in the form of small-scale calculations for agriculture. For example, give students the distance between crop rows and the distance between seeds, and ask them to work out how many potatoes can be planted on a hectare of land, etc. Use agroforestry models and crop associations for production yields, avoiding monoculture.

- Estimate losses and wastage for one or several foods. For example: tomatoes, how many were planted, how many were lost to drought, hail, bad transport or oversupply.

[82] The Incas used quipus, or coloured and knotted cords, to make calculations, and used combinations of knots to represent numbers, which were in turn used for the inventories of maize, beans, etc.

Natural Sciences:

- Explain the types of soils and contamination processes currently present in cultivated areas due to the use of agrochemicals. Describe alternatives to the use of chemical inputs that are dangerous for health (organic farming, etc).

- Study types of associations between plants in order to create a vegetable garden. Explain how the use of certain plants can vary soil properties. For example, legumes carry out nitrogen fixation.

- **Explain the processes of desertification, and the grave nature of destroying existing vegetation in the soil when carrying out certain social, economic or productive activities, as this leads to erosion. Report whether this problem currently exists nationally or locally.**

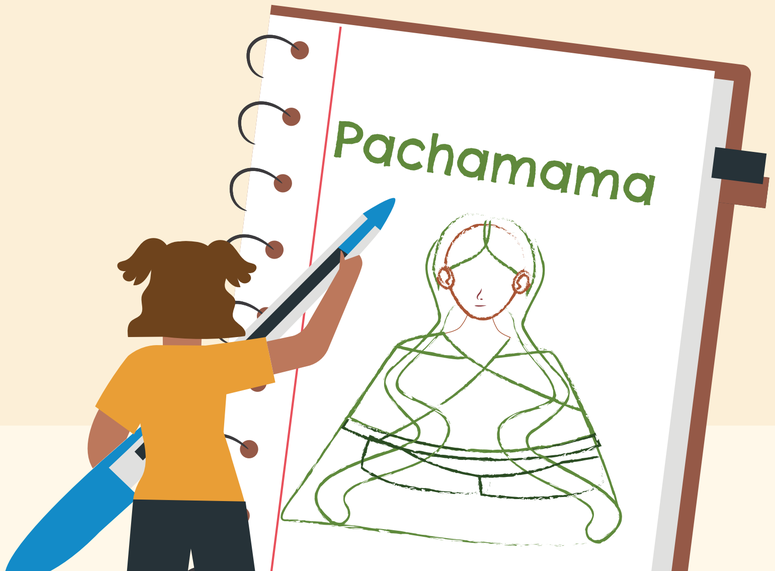
Example

Language and Literature:

- Invite students to write a story based on their experiences. It could be related to an agricultural activity they know or a farmer from whom they have bought produce. Underline the importance of recognising their work, which we sometimes forget about when purchasing our food in shops or supermarkets.

- **Research the etymology, origin and meanings of words related to soil: cultivation, culture, agriculture, organism, Pachamama, etc. Find out what the equivalent words are in other local or nearby languages.**

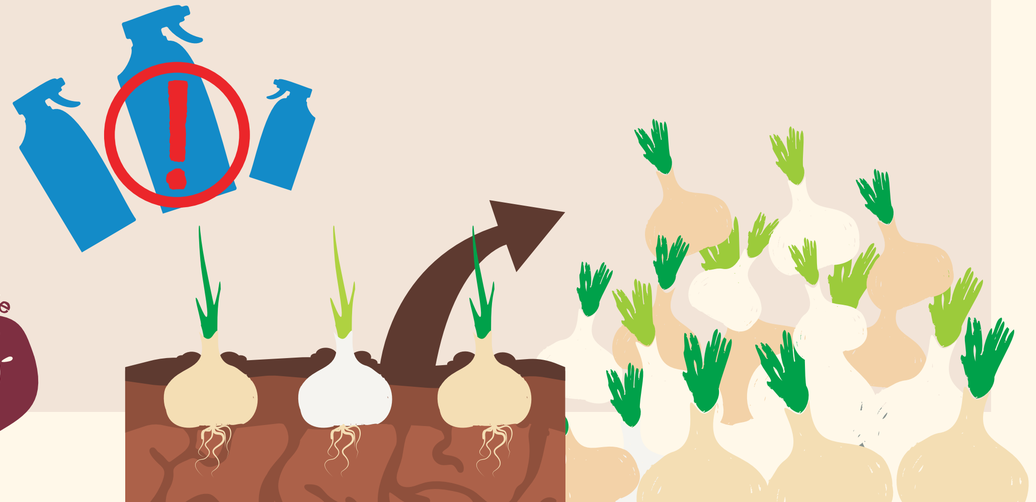
Example



Social Sciences:

- Explain the right to food sovereignty and food security as one of the currently recognised human rights.
- Relate the region's ancestral, local or community knowledge with soil use and its various practices, forms of protection and care.
- **Study the types of crops grown at other times and in other places. Contrast sustainable farming with extensive cultivation, use of pesticides and modified seeds.**

Example



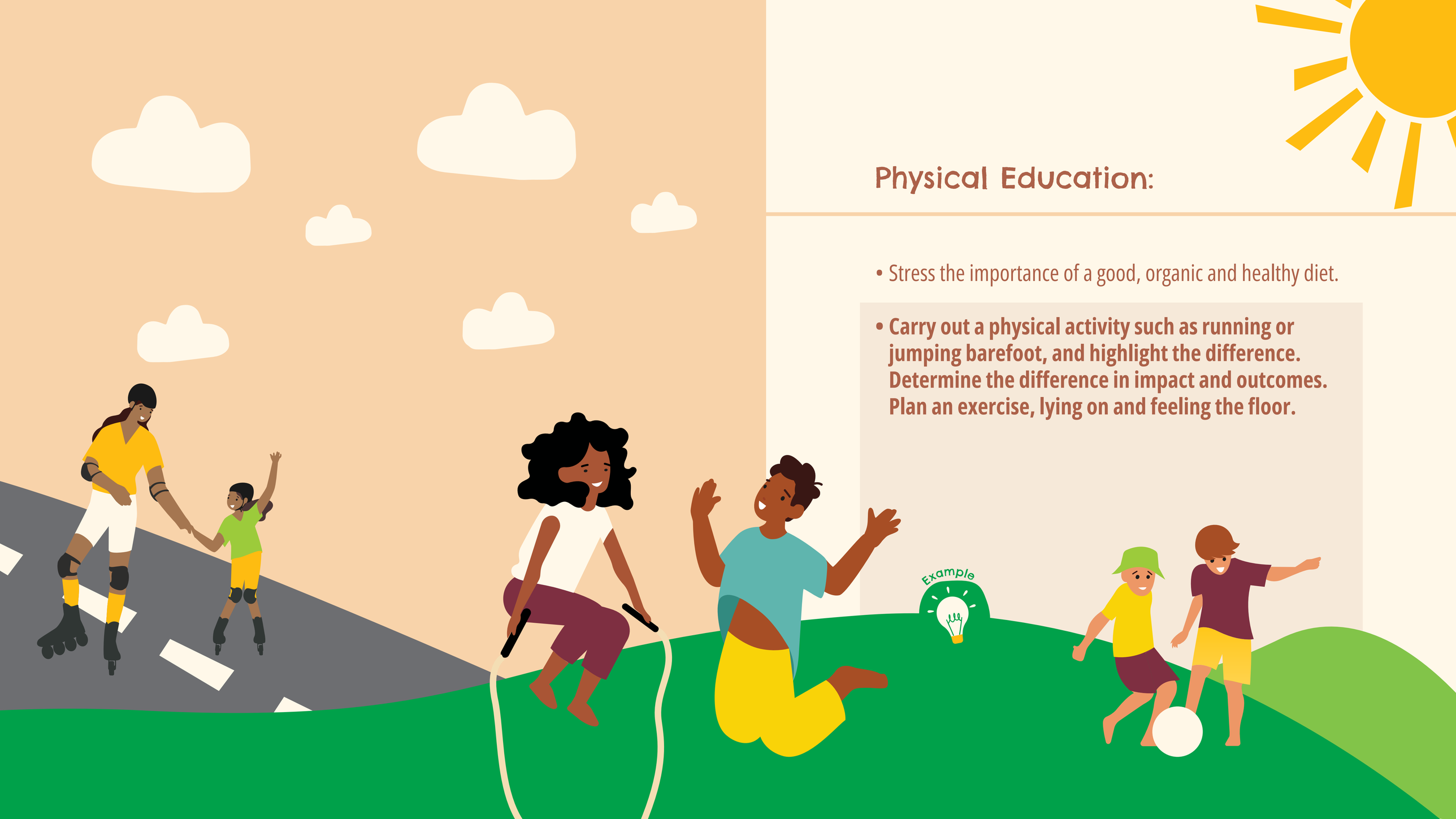
The Arts:

- Explain the types of soils and their composition: sand, clay and silt. Show how they can be used for various arts-related activities. Create a small piece with this material, in line with school availability.
- **Relate this to the arts related to the soil and earth performed nationally or locally today, and that were performed ancestrally by local groups.**

Example

Physical Education:

- Stress the importance of a good, organic and healthy diet.
- **Carry out a physical activity such as running or jumping barefoot, and highlight the difference. Determine the difference in impact and outcomes. Plan an exercise, lying on and feeling the floor.**



Potential interdisciplinary activities

Once the subject-based contributions have been led by the team of teachers in the classroom, a shared Desirable Scenario is designed and agreed at the Interdisciplinary Roundtable. For example:

"The education community recognises the value of organic food and soil protection for life, locally and nationally"

Once some of the details, approaches and scopes of the Scenario have been drafted and specified, organise interdisciplinary activities to celebrate and educate people in this subject at the educational centre and/or with the community.

PARTICIPATORY STUDY FOR ACTION: SOIL, ORGANIC FOOD AND FOOD SOVEREIGNTY.

Part 1. Participatory research

1. Example of an interdisciplinary soil activity

Main theme and focus: Participatory study on the local relationship between soil, organic food and food sovereignty, through consultation and participation for action, visiting an organic garden and interviewing the people who run it and distribute its products. If none is available or accessible nearby, visit a local market and interview the sellers.

Main activities and preparatory steps:

1. **Preparatory phase:** An interdisciplinary group of teachers analyses the possibility of visiting an easily accessible organic garden. If so, consultations are carried out in order to organise the visit of a group of students accompanied by the teaching staff. If this is not feasible, then explore the possibility of visiting a local market and interviewing the sellers of various products, such as fruit, vegetables, etc. Once you have decided on the best alternative, arrange a preparatory visit.

2. **Pre-organisational phase and preparation of materials:** Analyse how to carry out this participatory study, using a simple, age-appropriate version of the semi-structured interviews foreseen in the qualitative research. Use this to develop a thematic script covering selected topics that will receive open-ended responses from the interviewees. The themes are defined jointly, in order to accommodate convergent aspects from different disciplines. The topics are then expressed in the form of questions.

Example questions:

- *How long have you been working in this field? Why did you choose this career?*
- *Are you following in your family footsteps?*
- *Do women and men participate equally in the tasks, or do they perform different roles?*
- *Why did you become interested in organic farming and/or selling organic or non-organic produce? Do you have enough customers and people interested in what you do? Do you know about organic fertilisers, bio-fertilisers, etc?*
- *What challenges do you face?*
- *Which products are your best-sellers?*
- *Are these products related to local recipes? Which ones?*

3. **Gather the students for an explanation:** Once you have identified the students who will participate, explain the nature of participatory research, and how to conduct a semi-structured interview. Give all students the thematic script, i.e. the list of all the aspects that will be covered, and remind them to bring a few sheets of paper or a notebook to write down the answers and comments that arise. If the students come up with other questions, discuss their ideas and decide which to include. Agree who will develop which questions, so that everyone can participate in an orderly way. Each student should write down the answers they hear to all of the questions. Inform the group that they will be asked to produce their overall assessment and conclusions based on the responses and any additional comments, in order to define future activities.

4. **Activities before and during the visit:** At the beginning, a short group meeting will be held to discuss the importance of the study and the participation of the whole group of students. Emphasise that they need to show respect towards the people being interviewed and to remember the order of questions, and that they can always ask interviewees to clarify their answers if they're not sure that they've understood properly. Always remember to thank the interviewees for their time and answers.

   During the visit, questions should be asked in an orderly and interesting manner to ensure that each of the activities is enjoyable and that the students in the group are paying attention and recording the answers. They can ask any additional questions in order to gain a better understanding of the ideas expressed.

   Closing activity: Once the visit has taken place and all the interviews have been carried out, hold a brief meeting to analyse the responses. Ask the whole group to review and categorise the answers they wrote down because these will form the basis for part 2 of the activity, which will take place a few days later. In the meantime, consider activities that could be proposed as a result of the consultation.

PARTICIPATORY STUDY FOR ACTION: SOIL, ORGANIC FOOD AND FOOD SOVEREIGNTY.

Part 2. Conclusions and action proposals

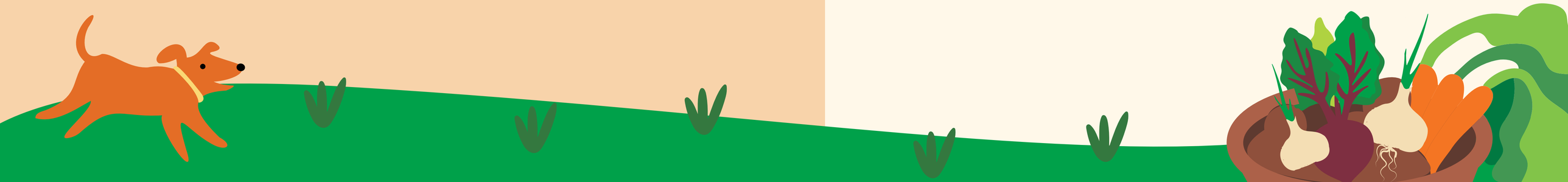
Main theme and focus: Generate a final analysis of the answers and study conclusions at a meeting involving all of the students who carried out the consultation. Emphasise the importance of direct consultation. It is also important to highlight the role of all the people who carried out the research, because they learned about and came to understand the situation, and also because this understanding allows them to contribute ideas for concrete actions. Focus on the participation of each student, on the important role of debate and the action proposals.

Core activity:

Participatory session in which each student presents what they noted, according to the topics covered in the interviews. The person responsible for asking a question now asks the group that same question so that the other participants can contribute what they understood and wrote down. A participatory process is organised based on the presentations to reach conclusions based on the answers and details raised by each of the topics discussed. All this is to be written down by the teaching team, on a blackboard or board, to arrive at the respective conclusions. It is important to recognise debate and exchange as a way of advancing understanding of the issues.

Once the list of conclusions has been finalised, invite the students to come up with action proposals for the various themes as a whole. These can be specific activities in the school, or with the educational community, or locally. For example:

- *Proposals for raising awareness of organic farming.*
- *Proposals to recognise the importance of food sovereignty.*
- *Proposals to support the people consulted, and publicise what they do, etc.*



This is an important opportunity to let the students' creativity flow, to clarify their views on the topic and their commitment to society and nature, and to share and spread what they have discovered and felt.

Internal reflection in the school:

Use this participatory experience as the basis for an exchange session with the teaching group examining the interest and future projection for this and other similar activities, aimed at achieving the effective participation of students of different ages, through the analysis and investigation of the world around them. Likewise, to value students' ability to lead and be active multipliers of this type of participatory processes towards action. Propose further steps to expand activities in this direction.

3. Another possible complementary activity:
Creation of a school garden. Plan the use of space in educational centres[83]. Creating a school garden will allow students to learn about the work involved in putting food on the table, the care and time required, etc. Follow up groups can also be organised. Food produced in the school can also be used in the school cafeteria, at school community gatherings or for a soup kitchen.

[83] United Nations Educational, Scientific and Cultural Organisation. (2017). TiNi Tierra de niñas niños y jóvenes para el buen vivir (TiNI: Planet for Children and Young People and Good Living). http://www.unesco.org/new/es/culture/themes/dynamic-content-single-view/news/tini_tierra_de_ninas_ninos_y_jovenes_para_el_buen_vivir/

Evaluation of the activities carried out:

The Desirable Scenario designed in the Interdisciplinary Roundtable is taken as the main reference for evaluating the activities carried out. In the case of soil, the group decided on the following Desirable Scenario: "The educational community recognises the value of organic food and soil care for local and national life". For evaluation purposes, two main purposes can therefore be considered to have been pursued:

- *The education community recognises the value of food production, and the difference of organic food*
- *The educational community recognises the value of soil care for life locally and nationally*

In order to evaluate the activities carried out, the group can start from four general criteria, specified through specific indicators developed in the educational centres, according to the different educational levels, ages and subjects, and based on established pedagogical approaches.

EVALUATION CRITERIA	MAIN FOCUS	CENTRAL THEME: SOIL						
		ACTIVITY 1. Study: Soils, organic food and food sovereignty.			**ACTIVITY 1.** Conclusions and the resulting action proposals.			**COMMENTS AND PROPOSALS**
		LEVELS			LEVELS			
		HIGH	MEDIUM	LOW	HIGH	MEDIUM	LOW	
KNOWLEDGE *Soil. Erosion, crop rotation. Desertification, agroecology, food security and food sovereignty*	*Extent to which understanding and internalisation of key issues has been achieved*							
PARTICIPATION, INTEREST *Response to the call, input during the visit, and follow-up meetings*	*Level of participatory process, motivation and commitment*							
OUTPUTS OBTAINED *Study carried out, final contributions and conclusions.*	*Achievement of visible, concrete results*							
FOLLOW-UP PROPOSALS *Group contributions and projections.*	*Presence of new ideas, projects and suggestions*							


AIR

AIR

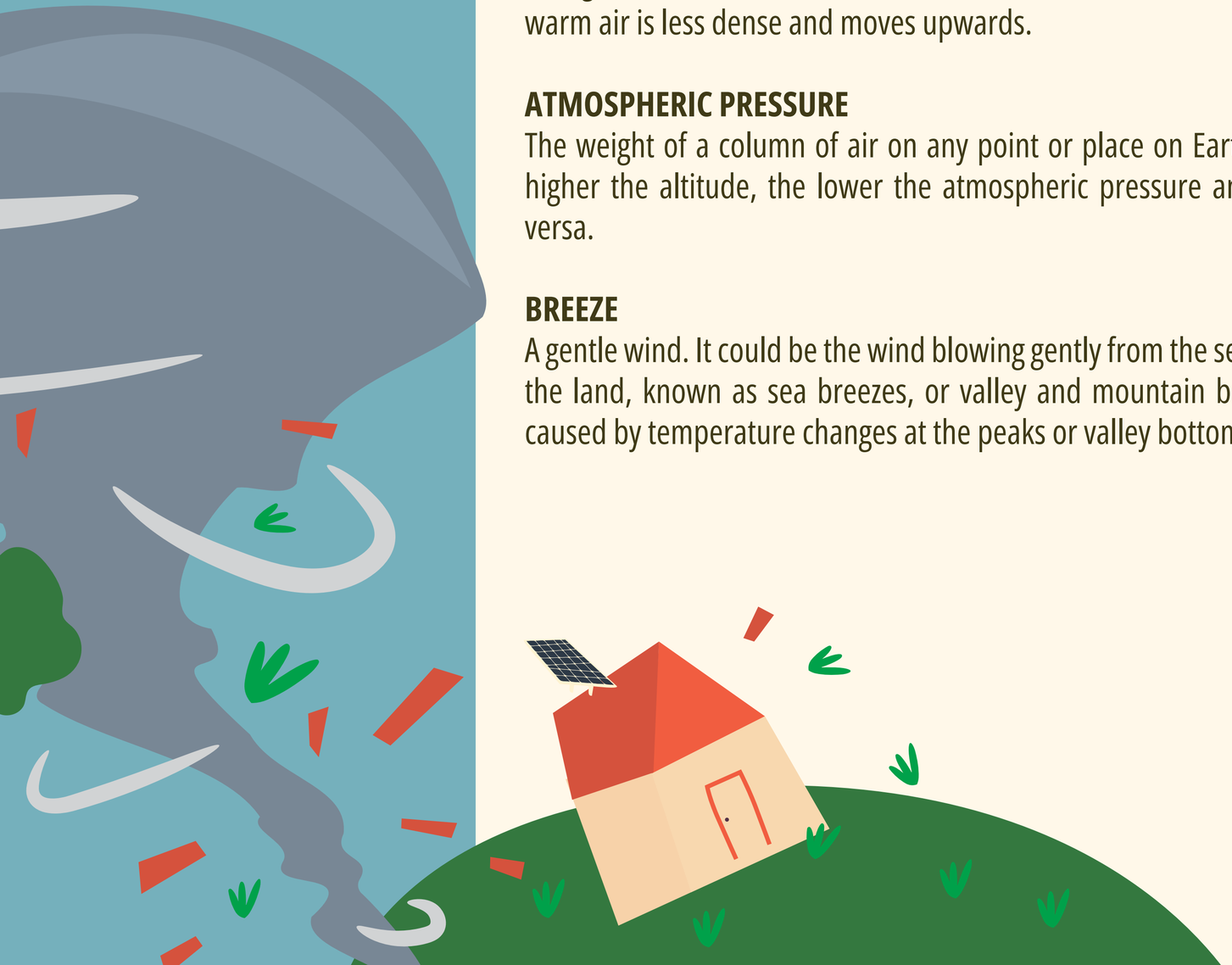
- Raise awareness of the importance and main characteristics of air, as well as the causes and effects of air pollution.
- Contribute to promoting better air quality locally and in the region

AIR

Air is essential for life, breathing is absolutely vital for the human body, and all other living things. Air is a mixture of gases found in the atmosphere, which are attracted to the surface of our planet due to the force of gravity.

It is composed of approximately 78% Nitrogen (N), 21% Oxygen (O2) and 1% of other substances, such as water vapour (related to local humidity), Ozone (O3), Carbon Dioxide (CO2), Hydrogen (H) and inert gases such as Krypton (Kr) or Argon (Ar).

Basic concepts:



WIND

It is a movement or flow of air in the atmosphere. It is the air, moving naturally, as a result of atmospheric conditions. Wind formation is related to differences in atmospheric pressure, caused by temperature changes. Cold air is denser and therefore moves downwards, and warm air is less dense and moves upwards.

ATMOSPHERIC PRESSURE

The weight of a column of air on any point or place on Earth. The higher the altitude, the lower the atmospheric pressure and vice versa.

BREEZE

A gentle wind. It could be the wind blowing gently from the sea onto the land, known as sea breezes, or valley and mountain breezes, caused by temperature changes at the peaks or valley bottoms.

HURRICANES

If the wind is very strong, especially if it rotates in a circle, it causes hurricanes, cyclones or tornadoes. These are generally stormy weather systems that bring rain and very intense winds, and can cause dangerous situations in the places they cross.

OZONE LAYER

This band of ozone is located approximately 19-23 km above the Earth's surface, in the layer of the atmosphere called the stratosphere. It forms a kind of shield that filters ultraviolet radiation and protects the earth from the sun's rays. Some polluting chemicals known as Ozone Depleting Substances (ODS) destroy the ozone in this protective layer, causing serious consequences..

SHORT-LIVED CLIMATE POLLUTANTS

They are also known as near-term climate forcers and include: methane (CH_4), black carbon (BC), tropospheric ozone (O_3) and some hydrofluorocarbons (HFCs). These pollutants have a significant climate impact as they have a high capacity to absorb the heat in the atmosphere and have estimated lifespans ranging from a few weeks to 15 years, which is shorter than the lifespan of CO_2 (about 100 years). Black carbon is also one of the main components of fine particulate matter (measuring less than 2.5 microns - PM2.5); along with ozone, it is a form of air pollution with serious effects on health and the environment.

Basic concepts:

AIR POLLUTION

It is a serious problem for health and life. Air pollution may have various origins; it is mostly caused by socio-economic activities, such as energy production from combustion, mining, construction, transport, industry, agricultural and livestock activities. Burning fossil fuels (such as coal, oil, natural gas) emits pollutant gases that affect the air, including carbon dioxide (CO2), sulphur oxides, nitrogen oxides, carbon monoxide (CO) and particulate matter. **These compounds pollute our air and can also cause acid rain, which affects plants, soils and agricultural yields.**

[84] United Nations. (2021a). Climate Change | United Nations. https://www.un.org/en/global-issues/climate-change;; https://www.ipcc.ch/

GREENHOUSE GASES

These gases can trap heat in the atmosphere and are recognised in the Kyoto Protocol: carbon dioxide (CO2), nitrous oxide (N2O), methane (CH4), and fluorinated gases such as hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF6). After more than a century and a half of industrialisation, deforestation and large scale agriculture, the quantities of greenhouse gases in the atmosphere have risen to record levels not seen in three million years.[84]

GREENHOUSE EFFECT

The emission of gases that can trap heat in the atmosphere, mainly due to a**nthropocentric activities, leads to an increase in the earth's temperature that is affecting the climate and exacerbating climate phenomena.** Greenhouse gases prevent the sun's rays from reflecting, causing them to remain partially in the atmosphere, retaining solar energy. In cities, the main sources of greenhouse gases are: **industrial activities, transport, increased energy demand or inadequate waste management.** In rural areas, agricultural burn-offs, poor livestock farming practices, the use of solid fuels such as wood or charcoal for cooking or heating, and forest fires are the main sources of these gases and also pollute the air, causing serious health impacts. All these processes have consequences for health and the planet.

Our connections with air

Air represents life, so our relationship with air symbolises our ability to stay alive, to breathe, to feel, to fill our lungs with every breath and at all times. We sigh when we're feeling emotional. When a fresh breeze comes from the sea or mountains, we feel at peace, as if surrounded by balance and vital freshness. With this air, nature leads us to feel part of her. The scent of the air after a storm or the smell of wet grass is soothing. The fragrance of flowers and aromatic plants contributes to our well-being and mental health.

We have many social connections with the air. If we are chatting to friends in a peaceful environment, words travel through the air, with the aromas of the food or drinks we are about to enjoy, generating pleasant and peaceful moments. Every social, work and home environment is related to the air, from many angles: noise makes us irritable and nervous, any polluting gases affect our health and foul smells make us uncomfortable. But if the air carries relaxing music, our mood improves. In short, we are always vitally connected to the air. This link can be pleasant and stimulating or become a threat to life and tranquillity.

Many LAC traditions are related to music, and especially wind instruments. Ancient sounds are still played on zampoñas, sikuris and all kinds of reed and wood flutes. Similarly, all over the world, native peoples and communities perform ceremonies involving aromas and incense, which contribute to processes of concentration and prayers, as in all religions.

Context in Latin America and the Caribbean

According to the Pan American Health Organisation (PAHO)[85], **air pollution is the main environmental health risk in the region. It is estimated that globally one in nine deaths are the result of conditions related to air pollution.** In Latin America, 79% of the population lives in towns and cities with more than 20,000 inhabitants, representing a major demand for energy, services, materials and goods production and consumption, freight transport and human mobility. Activities that require high energy consumption and have low efficiency, plus solid waste management, are another important factor as they are a permanent source of polluting emissions.

A series of individual and social actions are being promoted in the various countries in the region. These must be strengthened to improve the quality of the air we breathe. These actions include: **promoting electric vehicles, the use of public transport, reducing private car traffic or promoting intensive use (carpooling), encouraging the use of bicycles, reducing the waste we produce, protecting urban wooded areas and green spaces, promoting non-polluting industrial, agricultural and livestock processes, etc.**

The XXII Meeting of the Forum of Ministers of Environment of Latin America and the Caribbean held in 2021 asked LAC countries to re-establish the Intergovernmental Air Pollution Network and update its action plan. The Regional Action Plan on Air Quality 2022-2025 was developed in compliance with this Decision to establish a cooperation framework to reinforce integrated air quality management in the Latin American and Caribbean region, at national and sub-national level, and to facilitate and promote actions to reduce air pollution to protect health and the environment, contribute to climate change mitigation and make progress on achieving 2030 Agenda for Sustainable Development objectives[86]. Today, all these regional efforts are vitally important for improving air quality through the fundamental mechanisms of mutual cooperation.

[85] Pan American Health Organization. (2016). Air Quality. Regional Office for the Americas of the World Health Organization. https://www.paho.org/en/topics/air-quality?option=com_content&view=article&id=12918%3Aambient-air-pollution&Itemid=72243&lang=en

[86] Regional Action Plan on Air Quality for Latin America and the Caribbean 2022-2025 [español] [english]

Thematic contributions

Exact sciences
(mathematics, chemistry, physics, computer science):

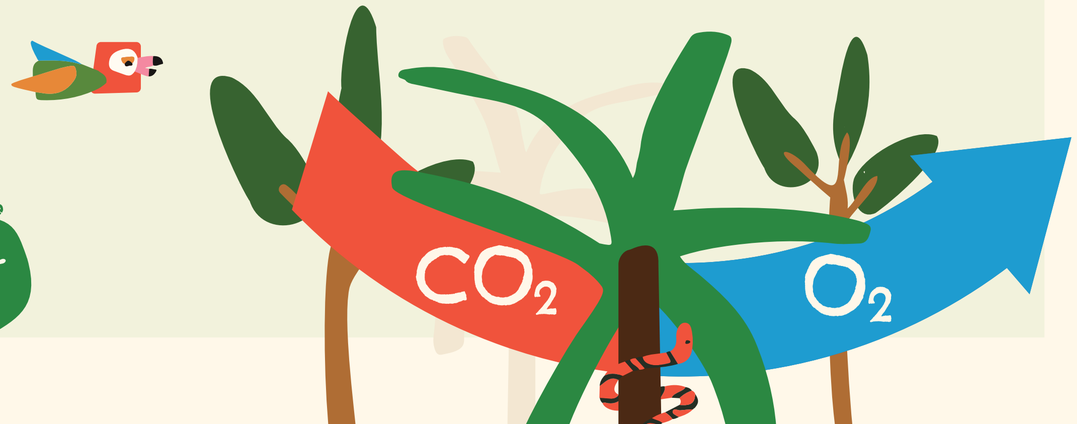
- Estimate the social and economic costs of disasters, contributions and prevention measures for natural disasters.
- Use digital maps and air quality phone apps. Assess the main hours, days and months of air pollution. Find out why this is the case.
- Design homemade air quality meters.
- Propose how to measure local atmospheric pressure, according to the altitude, and using reports.
- Calculate the flight of a paper aeroplane using an experiment.[91] Invite the class to make paper kites and examine how their velocities are influenced by the wind, their shape and launch site.

[91] For example, make several, different, paper aeroplanes with the students. Try to throw them with approximately the same force and speed. Repeat the launch of each paper aeroplane design 5 or 6 times. Record the results on a graph and calculate the mean for each aircraft. Conclude which aircraft flew the furthest, and why, etc. Did wind, direction, force, design, etc. influence the results?

Natural Sciences:

- Explain ocean ecosystems' capacity to absorb CO2 (blue carbon) and the impact of this process on acidification.
- Examine local wind patterns, and the likelihood of hurricanes or high winds in some known areas.
- Use bio-indicators to detect air pollution (experiment with lichens)
- **Explain plant and tree respiration, show how they are affected by pollution and their ability to absorb CO2.**

Example



Language and Literature:

- Analyse a few poems about air and their use of symbolism. For example: Oda al Aire (Ode to the Air), by Pablo Neruda.
- **Study the words for their power, in relation to what they mean, and the volume, force and nuance with which they are expressed when spoken out loud. The role of air, breath and intention in saying each word.**

Example

Social Sciences:

- Analyse the relationship between air pollution and society. How far are we aware of our negative and protective actions?
- Relate air to social sensitivities, for example, by inviting students to consider the various attitudes of people in their social and natural settings: the smells of the countryside, the aromas of meals, family memories of being in the outdoors and surrounded by wind, etc.
- Visit an air quality measurement centre.
- **Analyse what life is like in countries with high levels of pollution. What restrictions or care should their citizens take? How can such levels be prevented?**

Example

Desde las Artes:

- Organise a sequence of local dances, explore the importance of breathing in dance, its relationship to creativity, emotion and inspiration.
- **Explain the role of air in wind instruments, using local songs and instruments. Discuss how singers' voices are related to air and breathing.**

Example

Physical Education:

- Link all physical actions to lung capacity and the quality of the air entering our lungs.

- **Perform breathing exercises, emphasising the importance of breathing clean, healthy air.**

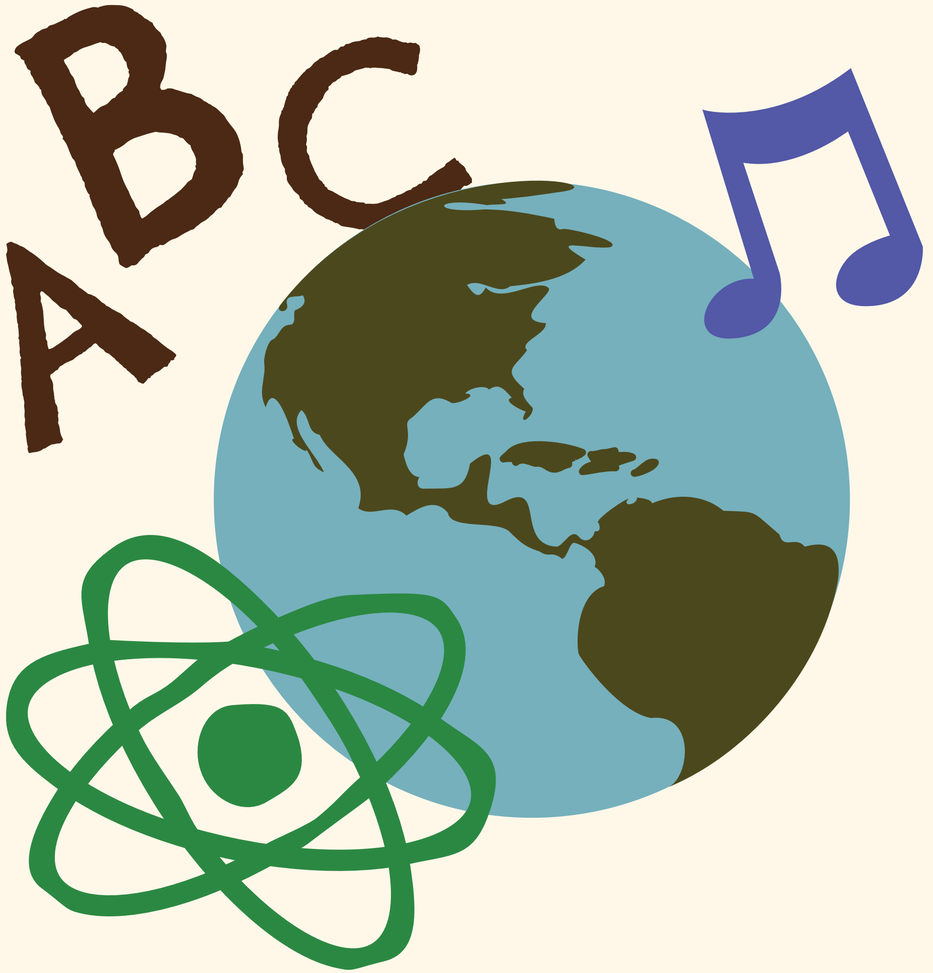
Ejemplo

Potential interdisciplinary activities:

Once the teaching team has made its subject contributions for classroom use, a common Desirable Scenario is designed and agreed at the Interdisciplinary Roundtable. For example:

"Students become actively aware of the importance of air quality, investigate the local situation, and generate proposals".

Once some of the details, approaches and scopes of the Scenario have been drafted and specified, organise interdisciplinary activities to celebrate and educate people in this subject at the educational centre and/or with the community.



CREATION AND OPERATION OF A GROUP OF "AIR SENTINELS"

1. Example of an interdisciplinary activity about air

Main theme and focus: Creation and implementation of a youth collective to monitor, alert and follow up on the polluting processes in their environment, in order to improve local air quality near the school. The collective will comprise a group of interested student volunteers who wish to learn and contribute to this task as part of their education. They will be guided by a small group of teachers, who will accompany them at certain times and give them ideas on how to carry out the various stages of the process. Example group name: "Air Sentinels".

Main phases and activities:

1. **Preparatory phase:** With the agreement of the education authorities, a small group of teachers will invite (especially final year) students to form the Air Sentinels. This invitation will be issued in an open session explaining the objective of the work of a group of leaders interested in improving air quality, as well as the interest, scope and contributions that such a group can make, underlining that it will be made up of volunteers.

2. **Organisational phase:** Once the volunteer group has been formed, a meeting is called to announce their possible activities and initial planning details, so that the students can become familiar with and add to the planned actions. All of this is based on the usual form of organisation at the school, as it will be voluntary work and can mainly be carried out in free periods and rooms. A "licence card" showing the group name will be issued for identification purposes.

3. **Focus and goal setting phase:** A leading environmental protection group is formed based on its interest in improving quality of life for humans and all other living beings on the planet. From this perspective, the project is very useful, as it involves contributions and explanations for other people to help them change their habits to activities with a lower environmental impact. The Air Sentinels will monitor the various human activities in and around the school in order to detect polluting processes so that they can be modified or reduced, to improve local air quality. The group can install bio-indicators, such as lichens, to monitor the air quality in their educational community.

4. **Planned observation and monitoring:** The group takes steps observe and monitor local polluting processes that they already know about (occasional, mobile, widespread and natural) that pollute the air. For example: public or private transport fumes, smoke from industrial chimneys, people smoking in enclosed spaces, noise pollution from entertainment venues, traffic noise, rubbish dump odours, etc.

5. **Development of data collection guides:** Taking the main sources of pollution into account, and supported by their teachers, the group draws up a guide to help them note down the events, places, days and times when they can detect pollution. They also agree on dates and deadlines for gathering the data. For example, two weeks are allowed for initial monitoring and another week is given as the deadline to confirm and review their findings.

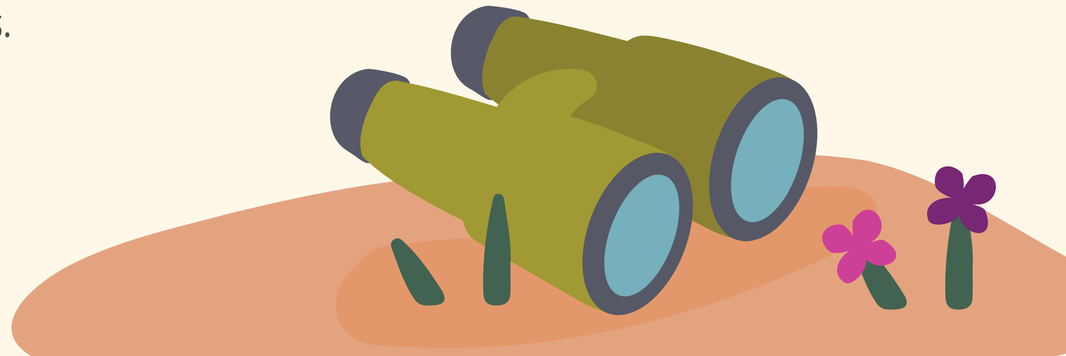
6. **Meetings:** The Air Sentinels will present the results of their first two weeks' surveillance at a meeting after the first deadline. Together with a group of teachers, they agree on the arrangements for the following week based on these results, in order to confirm their observations.

7. **Conclusions:** A number of conclusions will be reached at a second, final stocktaking meeting, such as:

- The most significant sources of air pollution detected,
- The places where these were perceived,
- The causes of such contamination,
- Ways to improve the situations observed, etc.

The group presents their observations to the entire educational community to raise awareness and determine whether a campaign to improve local air quality is appropriate. If appropriate, the Air Sentinels receive recognition for their work (diploma or similar).

8. **Follow-up stage:** Air quality observation processes will continue to be carried out by the Air Sentinels, who will strengthen their observational capacity and will be able to define possible future steps to achieve the goal of improving air quality in the locality.



OUTREACH CAMPAIGN TO IMPROVE LOCAL AIR QUALITY

2. Example of an interdisciplinary activity about air

Main theme and focus: The design and implementation of a simple local air quality improvement campaign, emphasising the importance of the health of all inhabitants, as well as the importance of protecting the health of other living beings. The approach will be based on the experience the Air Sentinels gained in the previous activity.

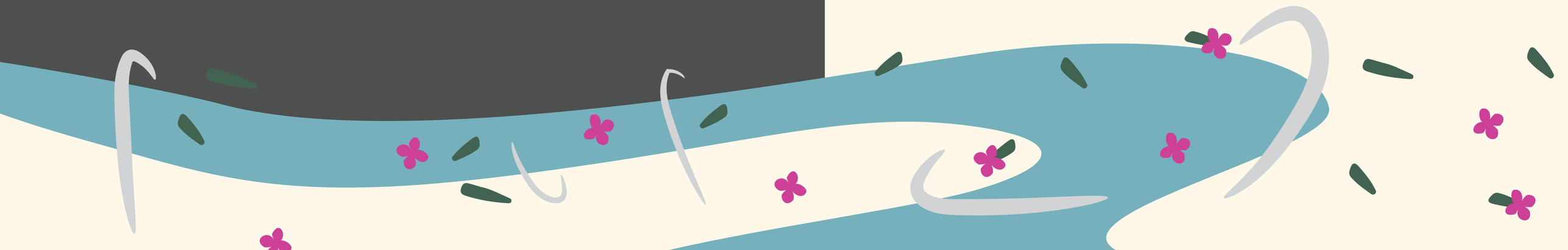
Activity and steps:

Design, implement and evaluate the campaign:
An awareness-raising campaign based on the experiences, balance sheets and findings of the Air Sentinels' work will be designed and implemented as follows:

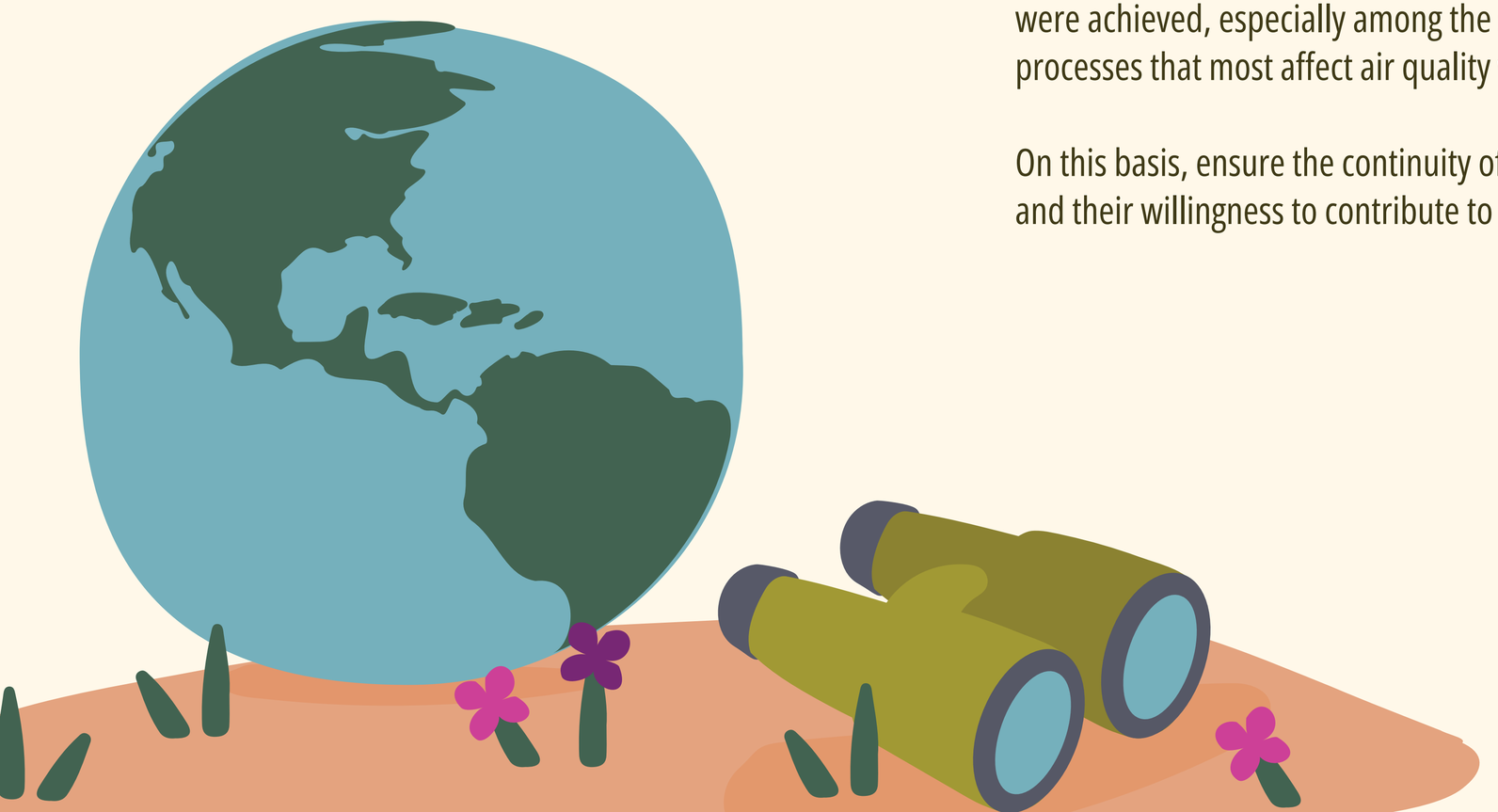
1. Establish the **main campaign objective,** related to improving air quality, and based on the most important aspects revealed by the Air Sentinels.

2. Define the **target audience** (the educational community, local authorities, community leaders, families, the general public, etc.)

3. Agree on the ways and institutions through which a few **funds** could be raised to support or endorse the campaign with the school. Work with a few media outlets who could be interested in publicising the campaign.



4. Select the **main media** to be used: for example, posters illustrated with photos or drawings on the importance of air for health; catchy messages to be sent to various media (radio stations, local newspapers, etc.); short talks that can be presented to various groups (neighbourhood communities, parent groups, non-governmental organisations, youth leaders, etc); use of social media (Twitter, TikTok, Facebook, Instagram, etc).



5. Design the **main message:** Agree on one or two meaningful phrases and images to warn about the risks of air pollution, and promote responsible behaviour.

6. **Launch the campaign:** Once these steps have been defined, launch the campaign at a participatory school meeting, to which some local authorities, journalists, social or cultural influencers, etc. can be invited. Involve students in the whole process.

7. **Evaluate the results and ensure continuity:** Once the campaign has been carried out, the results should be analysed within the defined deadlines. Examine whether any changes in attitude were achieved, especially among the sources of pollution, whether any commitment to improve the processes that most affect air quality was obtained, etc.

   On this basis, ensure the continuity of the Air Sentinels' surveillance actions – the value of their work and their willingness to contribute to local well-being is now publicly recognised.

Evaluation of the activities carried out

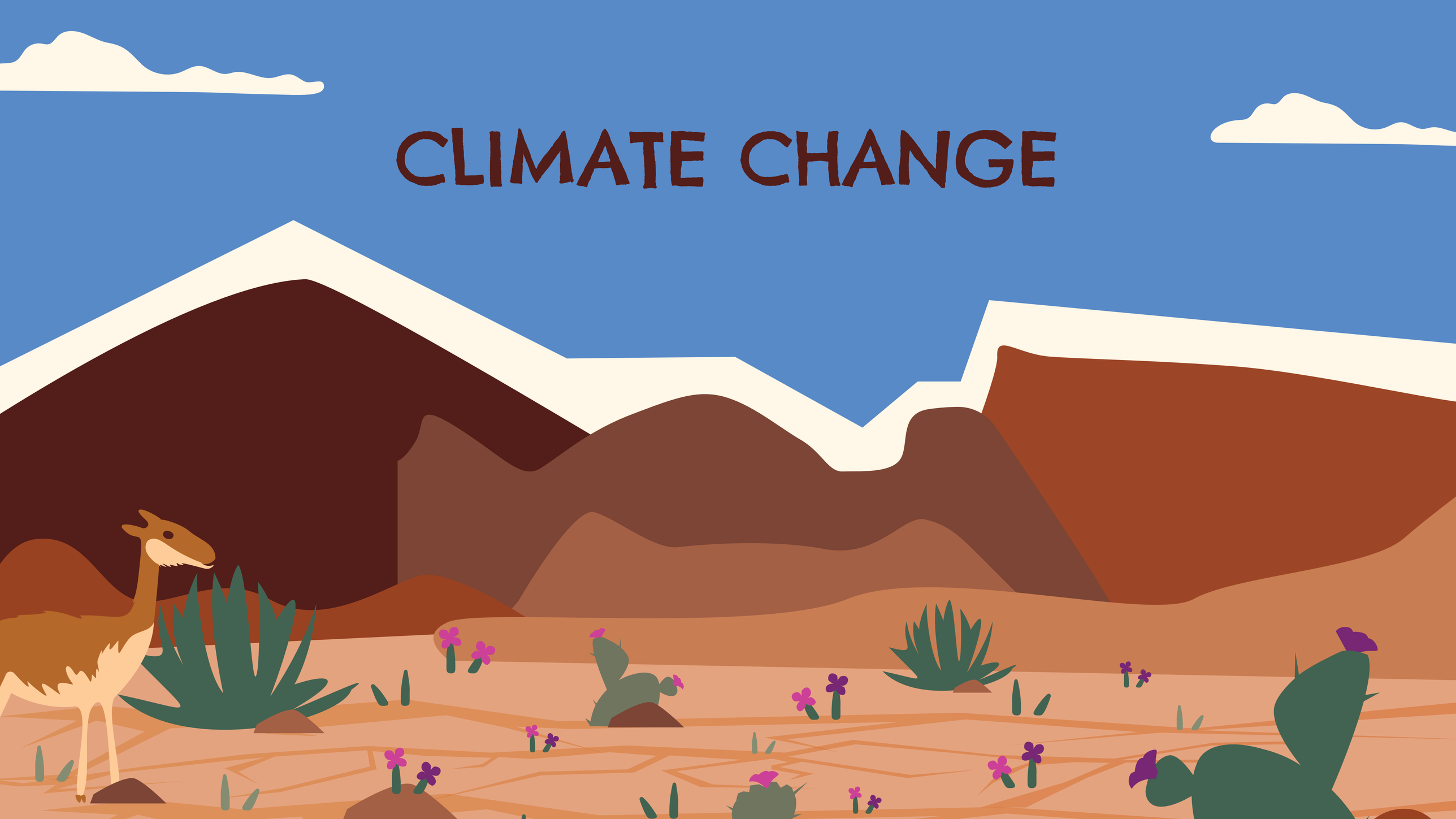
The Desirable Scenario designed in the Interdisciplinary Roundtable is taken as the main reference for evaluating the activities carried out. In this example of an activity on air: students became actively aware of the importance of air quality, investigated the local situation, and came up with proposals. For evaluation purposes, two main purposes can therefore be considered to have been pursued:

- Raise students' awareness of the importance of air quality
- Participatory research on the situation at local level and improvement actions.

In order to evaluate the activities carried out, the group can start from four general criteria, specified through specific indicators developed in the educational centres, according to the different educational levels, ages and subjects, and based on established pedagogical approaches.

EVALUATION CRITERIA	MAIN FOCUS	CENTRAL THEME: THE AIR						
		ACTIVITY 1. Creation and actions of the group of volunteers.			**ACTIVITY 2.** Campaign to improve local air quality			**COMMENTS AND PROPOSALS**
		LEVELS			LEVELS			
		HIGH	MEDIUM	LOW	HIGH	MEDIUM	LOW	
KNOWLEDGE *Air, wind, pollution, hurricanes, greenhouse effect, ozone layer*	*Extent to which understanding of key issues has been achieved*							
PARTICIPATION, INTEREST *Actively involved in forming the group, contributions to participatory and motivational meetings.*	*Level of participatory process, motivation and commitment*							
OUTPUTS OBTAINED *Guidelines for data collection Data obtained Campaign design and implementation*	*Achievement of visible, concrete results*							
FOLLOW-UP PROPOSALS *Follow-up actions*	*Presence of new ideas, projects and suggestions*							

CLIMATE CHANGE



CLIMATE CHANGE

Objectives

- Raise awareness and understanding of the main aspects of climate change and its principle impacts on various levels of human well-being: social, cultural, economic, environmental and health.
- Provide elements to raise education community awareness of its importance and possible local actions.
- Bring climate change terminology closer to the students' reality, so that they understand its impact on their immediate environment.

CLIMATE CHANGE

According to the United Nations Framework Convention on Climate Change (UNFCCC)[92]: Climate change is "a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods".

Such global climate change gives rise to a series of adverse effects, which are now a major global concern. **Changes in our climate are mainly caused by greenhouse gas emissions, which are usually the result of human activities.** Greenhouse gas emissions from human activities were responsible for approximately 1.1°C global warming between 1850-1900.[93]

[92] United Nations. (1992). United Nations Framework Convention on Climate Change. https://unfccc.int/resource/docs/convkp/conveng.pdf
[93] IPCC, (2021) Climate Change 2021: The Physical Science Basis https://www.ipcc.ch/report/ar6/wg1/

Basic concepts:

GLOBAL WARMING

Long-term increase in the average temperature of the Earth's climate system, and one of the main aspects of current climate change.

GREENHOUSE GASES (GHGS)

gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and re-emit infra-red radiation. Some of the main gases responsible for global warming are:

- **Carbon dioxide (CO2),** which is mainly emitted by burning fossil fuels, the destruction of forests and forest fires.
- **Methane (CH4),** which is released when organic matter decomposes in the absence of oxygen, as in swampy areas, landfills, etc. It is also released in rice cultivation and livestock activities.
- **Nitrous oxide (N2O),** released in industrial production and in the use of nitrogenous agricultural fertilisers, which has a high heating potential.
- **Hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulphur hexafluoride (SF6),** which are man-made fluorinated gases created by industry for specific uses, remain in the atmosphere for a long time and have a very high warming potential.

Today, we are suffering the serious and increasing consequences of climate change. According to the Convention, **the adverse effects of climate change are changes in the physical environment or biota**[94] resulting from climate change which have significant deleterious effects on the composition, resilience or productivity of natural and managed ecosystems or on the operation of socio-economic systems or on human health and welfare.

These include: the melting of the polar ice caps; rising sea levels; ocean acidification; loss of forest vegetation; droughts, fires and desertification in arid and semi-arid areas; the death of animal and plant species; overflowing rivers and lakes; air pollution; migration or extinction of wildlife species; migration of people (whom we now call "climate refugees"); destruction of food sources.

There are several global alternatives to these major challenges: mitigation, adaptation and resilience.

[94] All flora, fauna and other organisms in a given place.

Basic concepts:

MITIGATION

This includes policies, technologies and measures to limit and reduce GHG emissions and enhance GHG sinks[95]. Some of the mitigation activities being promoted include: Afforestation and reforestation; early warning of forest fires and programmes to fight pollution in mining and hydrocarbons; energy efficiency; energy transition to renewable energy; electrification of industrial processes; efficient means of transport (electric public transport, cycling, car sharing); carbon or energy tax and emission markets; voluntary energy use agreements and carbon emission standards; information and institutional and social actor capacity building; inter-institutional and international coordination; etc.

ADAPTATION

According to the UNFCCC, adaptation means adjustments in ecological, social or economic systems in response to actual or expected climatic stimuli and their effects or impacts[96]. There is no ideal adaptation solution, as this depends on the unique context of the country, sector, organisation or region. Examples include: building safer facilities and infrastructure; nature-based solutions (NBS)[97]; ecosystem restoration; landscape restoration and reforestation; prevention and precautionary measures; recovery of extremophile species, restoration of wetlands, grasslands and corals; etc.

[95] "Sink" means any process, activity or mechanism which removes a greenhouse gas, an aerosol or a precursor of a greenhouse gas from the atmosphere. For example: Trees.
[96] UNFCCC. (n.d.). What do adaptation to climate change and climate resilience mean? Unfccc.int. Retrieved 29 September 2022, from https://unfccc.int/topics/adaptation-and-resilience/the-big-picture/what-do-adaptation-to-climate-change-and-climate-resilience-mean
[97] Nature-based Solutions (n.d.) Nature-Based SolutionsTM leverage nature and the power of healthy ecosystems to protect people, optimise infrastructure, and safeguard a stable and biodiverse future. Retrieved 29 September 2022, from https://www.iucn.org/our-work/nature-based-solutions

CLIMATE RESILIENCE

The capacity of an ecological or social system to absorb disturbances while maintaining the same basic structure and ways of functioning, the capacity for autonomous organisation and the capacity to adapt to change.

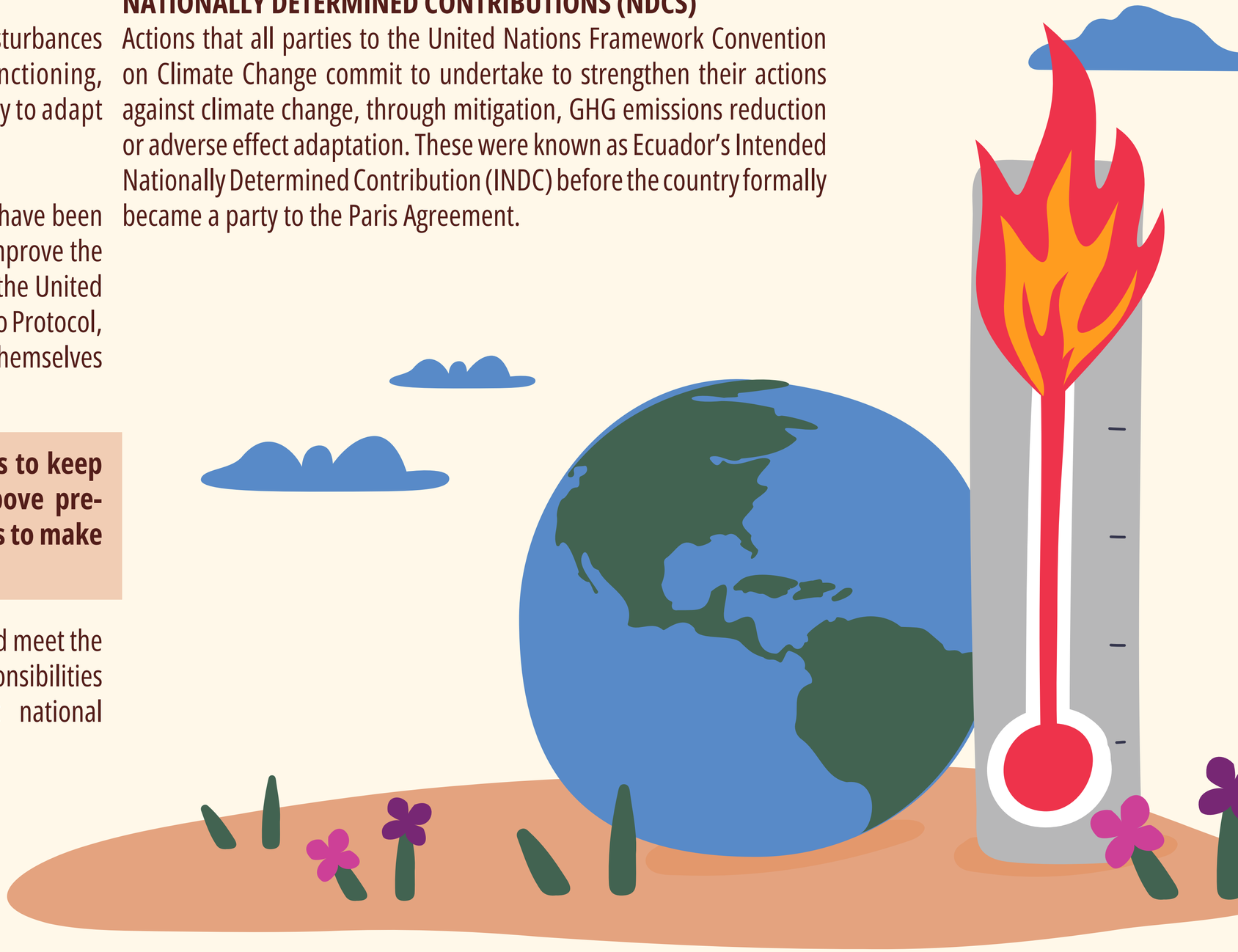
Numerous meetings and various international agreements have been achieved in recent years, intended to make progress and improve the global climate change situation. Based on the principles of the United Nations Framework Convention on Climate Change, the Kyoto Protocol, an agreement by which industrialised countries committed themselves to reduce their GHG emissions, was signed in 1997.

The Paris Agreement was approved in 2015.[98] It aims to keep the average global temperature well below 2ºC above pre-industrial levels this century, and commits the parties to make all efforts necessary to limit this increase to 1.5ºC.

It establishes a number of national contributions that should meet the international principle of "common but differentiated responsibilities and respective capabilities, in the light of different national circumstances".

NATIONALLY DETERMINED CONTRIBUTIONS (NDCS)

Actions that all parties to the United Nations Framework Convention on Climate Change commit to undertake to strengthen their actions against climate change, through mitigation, GHG emissions reduction or adverse effect adaptation. These were known as Ecuador's Intended Nationally Determined Contribution (INDC) before the country formally became a party to the Paris Agreement.

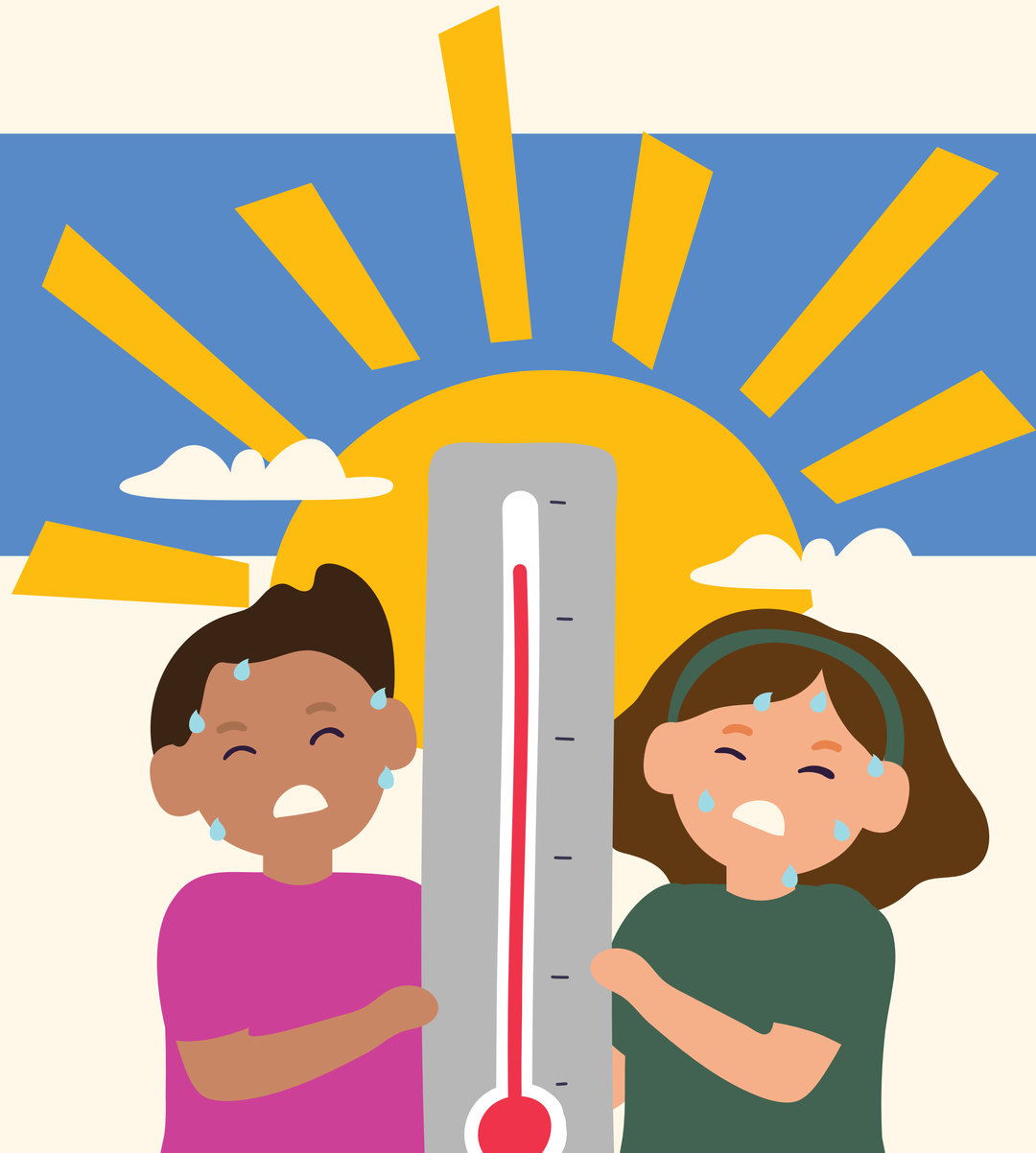


[98] UNFCCC (2022) Paris Agreement unfccc.int/sites/default/files/english_paris_agreement.pdf

Our connections with climate change

Humans, like animals and plants, have a natural relationship with the climate. **Throughout history, natural climate changes have prompted humans to change their activities or places. Such adaptation processes also occurred in fauna and flora.** The behaviour of some bird species, such as the Furnarius rufus ovenbird whose mud nests have special entrances that local people have observed to be placed according to the weather conditions, providing interesting examples of adaptation. This specificity is also the subject of scientific research.

Today, the most important thing to bear in mind is to define these situations and their connections with pollution and the current aggravation of climate situations, and the consequent actions of human beings, animals and plants. Climate change has now caused serious social and economic concerns. International meetings on the subject, youth movements, news of the various problems caused by climate change, as well as warnings and proposals by various organisations are worrying people in their various spheres of life.



This has led to some interesting campaigns and reactions to improve social habits and behaviour, to try to reduce personal or collective emissions and to limit activities that lead to environmental problems at all levels. Further work is needed, but we are certainly at a crucial moment for overcoming this situation and we need to change our social and economic attitudes by designing policies to support this process. **The goal is to achieve systemic changes that transform how we produce, consume and live; bearing in mind that our societies are part of and dependent on our natural environment and its ecosystem services.**[99]

[99] FAO (2022) https://www.fao.org/ecosystem-services-biodiversity/en/

Throughout history, adaptive behaviours and activities supported by culture have emerged and developed. Today, these can be held up as examples for overcoming some of the problems related to climate change. Many of the examples in the region are very interesting, for example the study on Conocimientos Ancestrales y Adaptación al Cambio Climático en Comunidades Altoandinas de la Región de Huancavelica (Ancestral Knowledge and Adaptation to Climate Change in High Andean Communities in the Huancavelica Region).

It compiles and analyses the practices, testimonies and beliefs farmers use to predict extreme weather variations (frost, snowfall, hailstorms, torrential rains, droughts, etc). The high Andes population in alpaca-breeding areas hold a wealth of traditional knowledge, experience, adaptive capacity and resilience to climate variability, and are therefore in one of the best positions to adapt to or cope with climate change. They can be an example of adaptation for other social groups and diverse communities.

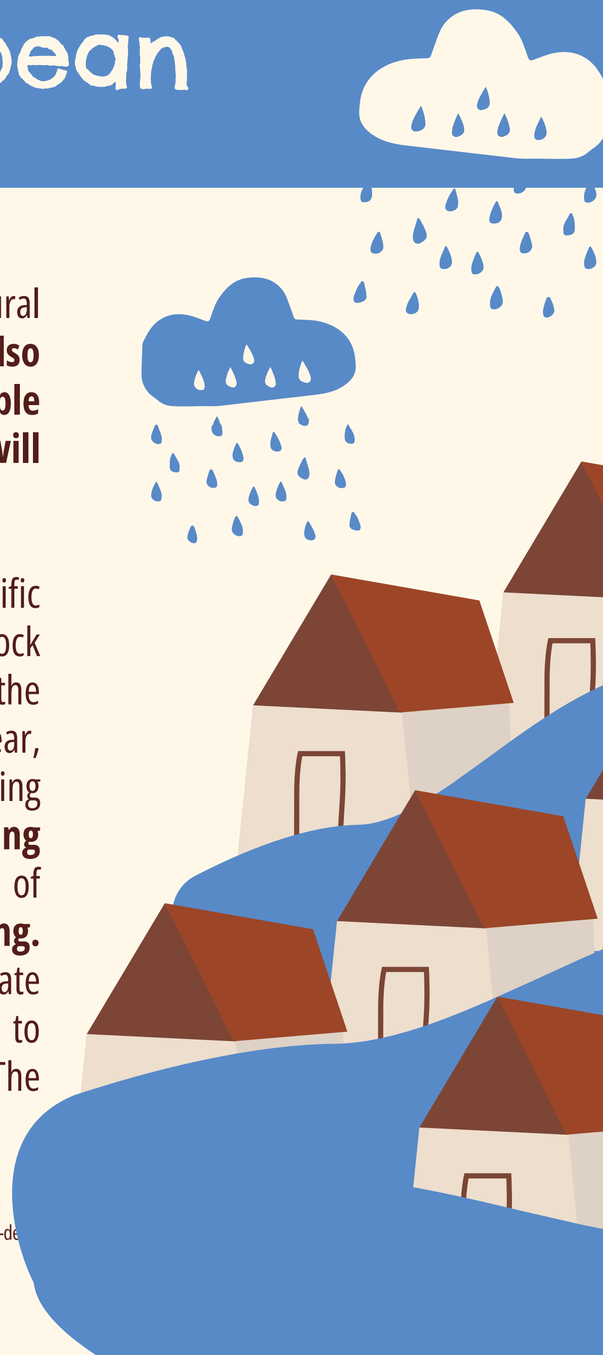
Similarly, numerous experiences in all countries in the region can make a significant contribution to tackling and overcoming the effects of climate change.

Context in Latin America and the Caribbean

The countries of Latin America and the Caribbean face a complex situation in terms of climate change. The *Economics of Climate Change in Latin America and the Caribbean*[100] report shows its asymmetry: **although the region emits less than 10% of global emissions, it is extremely vulnerable to the impact of climate change.** It also observes that GHG emissions in LAC have a different structure from those of global emissions: emissions from land use change are relevant, as they are gradually decreasing, and the region has a cleaner energy matrix, although emissions are increasing due to evolutions in income and energy consumption along with transport, particularly urban.

The study also mentions a doubly inequitable situation, as the higher-income economic strata are responsible for most of the emissions in Latin America and the Caribbean; the lower strata produce fewer CO2 emissions, but are more vulnerable to their effects: they live in geographical regions more exposed to extreme weather events and have fewer resources to adapt to the new climate conditions. And it is precisely these communities who are most dependent on the natural resources affected by climate change. **This climate injustice is also manifesting at global level, as the populations least responsible for climate change will be those most affected by it, and will face the greatest resulting losses and damage.**

All countries have committed to various NDCs in line with their specific policies and capabilities. An analysis of the NDCs in LAC[101] takes stock of the information received and concludes that Latin America and the Caribbean's responsible approach to tackling climate change is clear, as the region has demonstrated its willingness to contribute to reducing emissions and is clear about the fact that **adapting to changing climate conditions is a priority,** for which the conservation of biodiversity is key as **biodiversity loss is linked to global warming.** For example, Costa Rica's NDC included the creation of a Climate Change Scientific Council and a Climate Change Advisory Council to improve the collection and quality of climate change information. The



[100] Economic Commission for Latin America and the Caribbean. (2018). Economics of climate change in Latin America and the Caribbean: a graphic view https://repositorio.cepal.org/handle/11362/43889

[101] United Nations Development Programme. (2016). Análisis de las (I)NDC de la región de América Latina y el Caribe (Analysis of (I)NDCs in Latin America and the Caribbean region). https://www.latinamerica.undp.org/content/rblac/es/home/library/environment_energy/analisis-de-las--i-ndc-de region-de-america-latina-y-el-carib. html

Carbon Neutral Country programme was also implemented, aiming to bring GHG emissions to zero through the use of 100% renewable energy sources nationwide, including a proposal for electric public transport. Another example is the creation of the Consejo Presidencial del Cambio Climático (Presidential Council on Climate Change) during the Honduran NDC implementation process to coordinate and promote policies and the direction of national environmental governance. In order to comply with its Paris Agreement commitments, Uruguay formed an inter-institutional group to implement the NDCs and a range of indicators to monitor progress and adaptation plans[102].

In compliance with the objectives of the Paris Agreement and the Sustainable Development Goals (SDGs)[103], **the region has begun the transition towards low-carbon development paths and sustainable models.** Many countries have put people and rights at the centre of their adaptation and mitigation measures, seeking to respect, protect and fulfil human rights.

In addition, **the Regional Agreement on Access to Information, Public Participation and Access to Justice in Environmental Matters in Latin America and the Caribbean (Escazú Agreement[104]) is the first regional environmental treaty and the first environmental agreement** in the world to establish specific provisions on human rights defenders in environmental matters. It is also a valuable tool for improving climate governance and countering the adverse effects of climate change in the region's countries. **The Escazú Agreement helps safeguard human rights in the context of climate change. It promotes access to climate information, and proposes preventing, investigating and punishing all attacks against human rights defenders in environmental matters.** As the world's first international treaty to address the issue of human rights defenders in environmental matters, it recognises the realities in the region. According to the latest "Last Line of Defence" report[105] by environmental rights organisation Global Witness, LAC is the most dangerous region for environmental defenders. In 2020, more than half of the attacks on defenders occurred in just three countries: Colombia, Mexico and the Philippines.

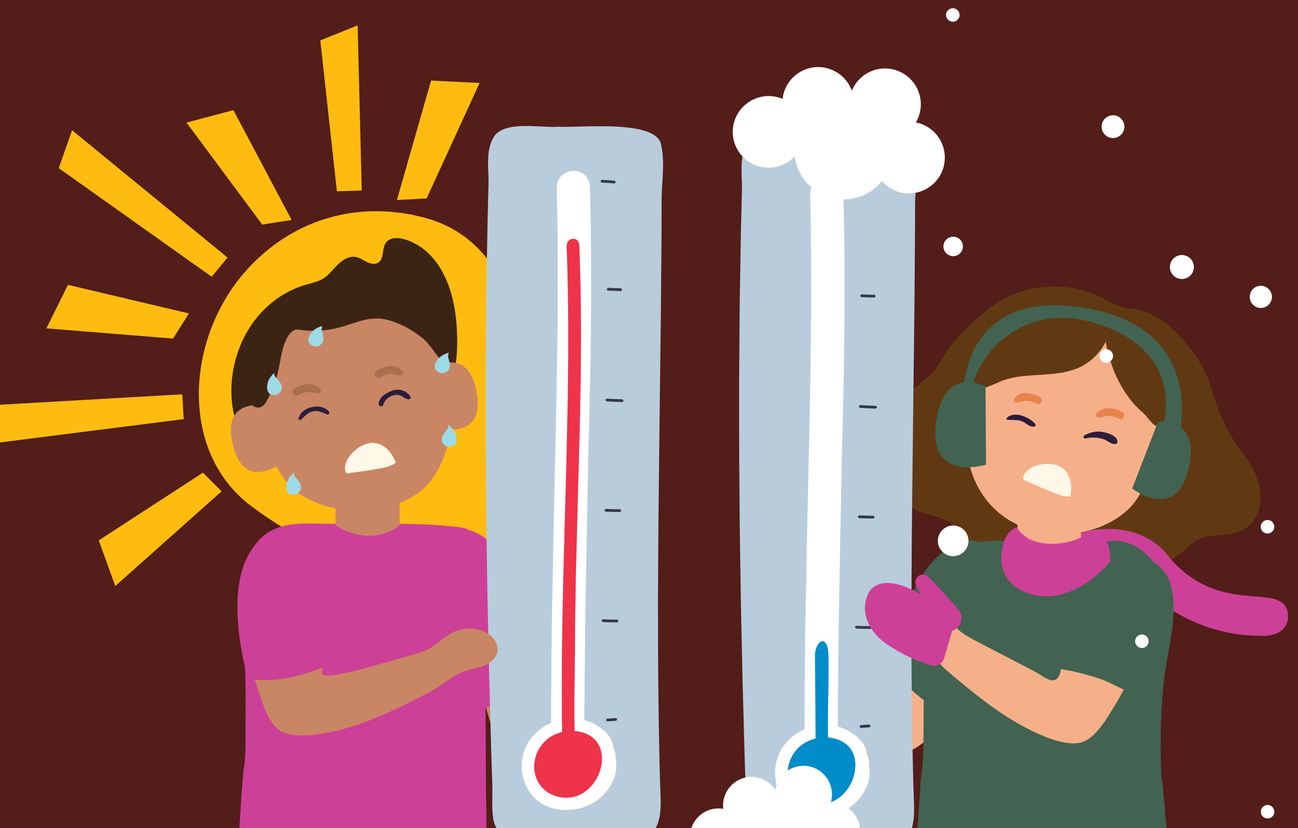
[102] Economic Commission for Latin America and the Caribbean (2019). Panorama de las contribuciones determinadas a nivel nacional en América Latina y el Caribe (Overview of contributions determined at the national level in Latin America and the Caribbean), 2019 https://repositorio.cepal.org/bitstream/handle/11362/44974/S1900855_es.pdf?sequence=4&isAllowed=y

[103] UN (n.d.) Sustainable Development Goals https://www.un.org/sustainabledevelopment

[104] Economic Commission for Latin America and the Caribbean. (2018). Regional Agreement on Access to Information, Public Participation and Access to Justice in Environmental Matters in Latin America and the Caribbean. https://repositorio.cepal.org/bitstream/handle/11362/43583/1/S1800428_en.pdf

[105] Global Witness. (2021). "Last Line of Defence" Global Witness. https://www.globalwitness.org/en/campaigns/environmental-activists/last-line-defence/

Thematic contributions



Mathematics:

- Investigate changes in local temperatures over the last five years and help students show the results of this research in a simple graph, to allow them to draw conclusions.

- Explain what global climate indicators are, and that their aim is to describe this phenomenon so that it can be understood through a set of numerical data referring to: surface temperature, ocean heat, increase in greenhouse gases, rises in sea level, glacier status and the extent of Arctic and Antarctic sea ice, etc.

- **Calculate emissions from human activities or industries, carbon footprint calculators.**

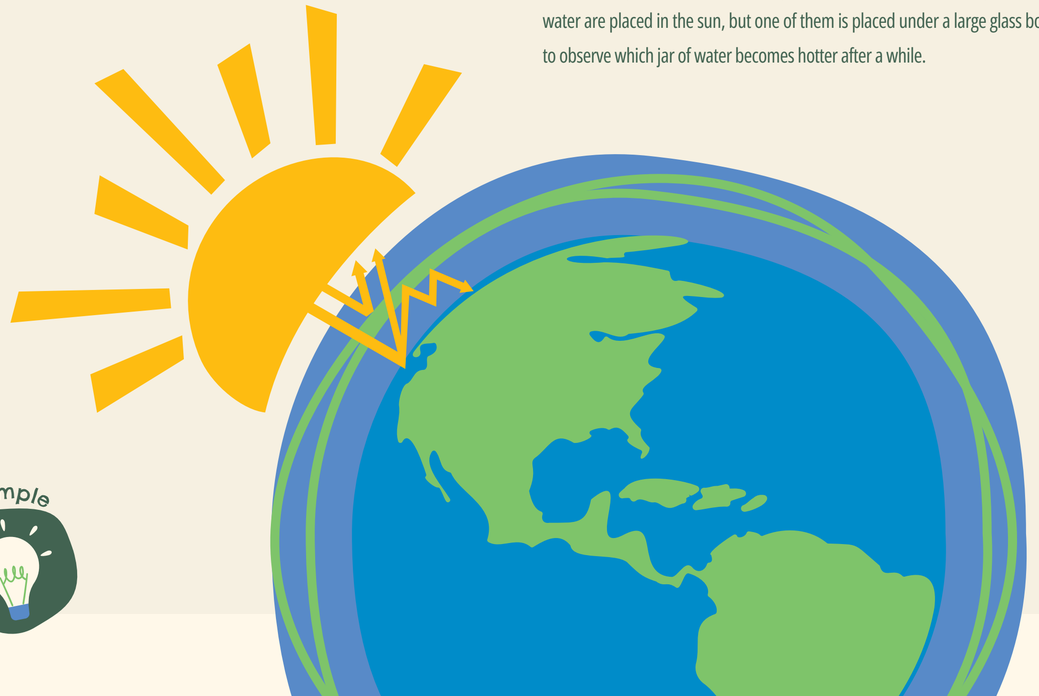
Natural Sciences:

- Analyse the relationship between climate change and the carbon fluxes related to the lithosphere, atmosphere, oceans, living matter, fossils, etc.

- Experiment with ecosystem-based adaptation measures.

- **Conduct a simple experiment[110] to explain the greenhouse effect.**

[110] For example, the well-known experiment in which two small glass jars of water are placed in the sun, but one of them is placed under a large glass bowl, to observe which jar of water becomes hotter after a while.



Example

Language and Literature:

- Explain how our planet's grave situation is also reflected in literature, by different authors around the world.

- Analyse a poem about climate change by a Latin American or Caribbean author, or from the respective country. For example, analyse the climate change poem, "Aún hay tiempo" (There is Still Time) by Brazilian author Renata Machado.

- **Book club, encourage students to read books and comics about climate change (for example, Ishmael by Daniel Quinn, Silent Spring by Rachel Carson, The Future We Choose by Christiana Figueres and Tom Rivett-Carnac, etc.)**

Example

Social Sciences:

- Study the relationship between human rights and a healthy environment, and climate change today.
- As a class, define the importance of participation and means of citizen activism to address the adverse effects of climate change and find alternatives.
- Analyse the perspective of indigenous people and local communities, and the need to not only to learn from them, but to involve them in decision-making on issues that directly affect them.
- **Analyse the role of climate leaders and social movements, the importance of children and young people as environmental activists.**

Example

The Arts:

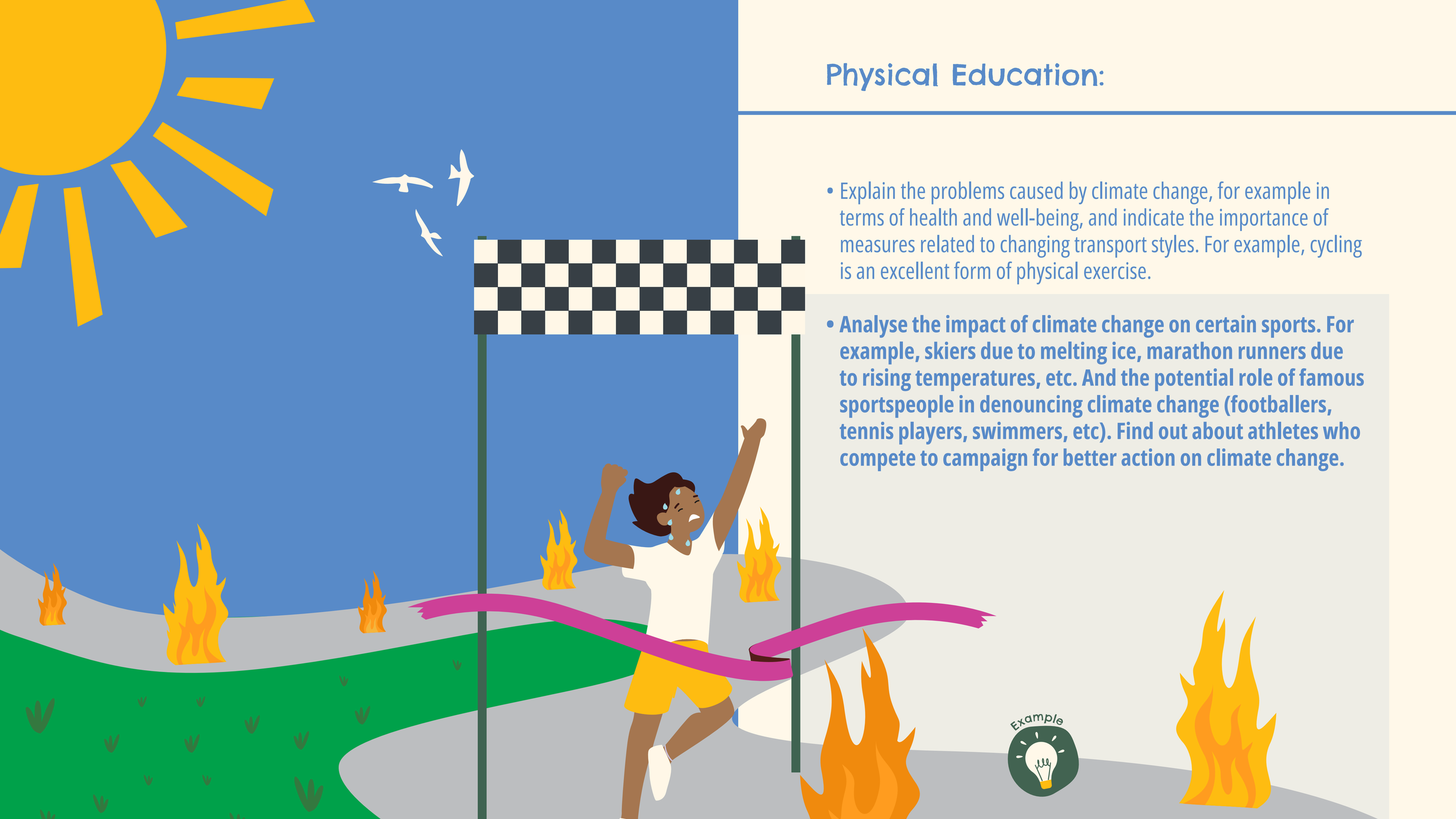
- Explain the importance of contemporary artists in denouncing the impact of climate change and come up with various ways students can reflect on the problem in a critical and constructive way in class.
- **Highlight the groups of artists and young bloggers in various LAC countries who are forming collectives, and creating initiatives to denounce climate change through art.**

Example

Physical Education:

- Explain the problems caused by climate change, for example in terms of health and well-being, and indicate the importance of measures related to changing transport styles. For example, cycling is an excellent form of physical exercise.

- **Analyse the impact of climate change on certain sports. For example, skiers due to melting ice, marathon runners due to rising temperatures, etc. And the potential role of famous sportspeople in denouncing climate change (footballers, tennis players, swimmers, etc). Find out about athletes who compete to campaign for better action on climate change.**



Potential interdisciplinary activities:

Once teachers have made their subject contributions for classroom use, the Interdisciplinary Committee meets to design and agree on a common Desirable Scenario. For example:

"An Observatory is established to determine the degree of local knowledge and awareness of climate change, as a first step for future actions to raise awareness on the subject".

Once some of the details, approaches and scopes of the Scenario have been drafted and specified, organise interdisciplinary activities to celebrate and educate people in this subject at the educational centre and/or with the community.

SCHOOL CLIMATE CHANGE OBSERVATORY

1. Example of an interdisciplinary activity on climate change

Main theme and focus: Create and implement a School Climate Change Observatory to analyse and follow-up on actions, which observes the main local and zonal situations related to climate change. This pedagogical space allows students, teaching staff and the educational community to analyse the most worrying climate situations, from the perspectives of the different subjects, and considering the experiences of families, neighbouring communities, etc. These analyses should be carried out with broad participation so that they can lead to proposals for action.

Activity 1: Establish and launch the School Climate Change Observatory operations.

The main steps are as follows:

1. **Location and development of the Observatory's activities:** The work will be based in the educational centre itself, but its activities will mainly be carried out in the locality, with families, in the institutions, involving different social and community groups, etc.

2. **Internal organisation:** Once it has been agreed that the school is interested in creating a School Climate Change Observatory, a coordinator will be appointed: a teacher interested in the subject, who can dedicate some sessions to guiding students in this process.

Subsequently, students who wish to form part of this Observatory will be invited to do so, certain activities may be considered relevant for assessments in some of subjects. This must naturally be in accordance with the school's customs or approaches.

3. **Diagnosis:** Once the students have gathered to create the Observatory, the importance of studying the various issues related to the local situation is explained, and some potential actions that could be taken to improve the current situation are proposed.

a. Topic and survey. Conduct a study to diagnose local perceptions of climate change. To do so, draft a survey that includes a few questions, such as:

- ***Do you know, or have you heard anything about climate change?*** *Yes - No - A little*
- ***Has the local climate changed in recent years?*** *Yes - No*
- ***If yes, what have you noticed?***
- ***Can you name a few of the impacts of climate change?*** *Yes - No*
- ***If yes, what are they?***
- ***Can you describe some of the causes of climate change?*** *Yes - No*
- ***If yes, what are they?***
- ***Can you propose any activities you could do to improve the local climate change situation?***
- ***Can you recommend an activity that should be done to address this challenge?***

b. Form: Once the group has defined all the questions, it's time to create a survey form. Each form starts with the respondent's full name, age, gender, profession, etc. This is followed by the list of questions, including the spaces for yes or no answers, and room for detailed answers to more open questions.

c. Distribution: Divide the survey group into segments by activity, for example, public sector employees, people working in health, business administration, shop owners, street vendors, journalists, etc. Then the final sample is designed and distributed between the students involved in the Observatory, or by activity groups, so that they can interview 10 people each.

d. Implementation of the survey and conclusions: Once the task has been given out, students are given two weeks to complete it in their sectors and areas. When all of the answers have been completed, hold a debriefing meeting to count the Yes-No responses and list the proposals that have emerged.

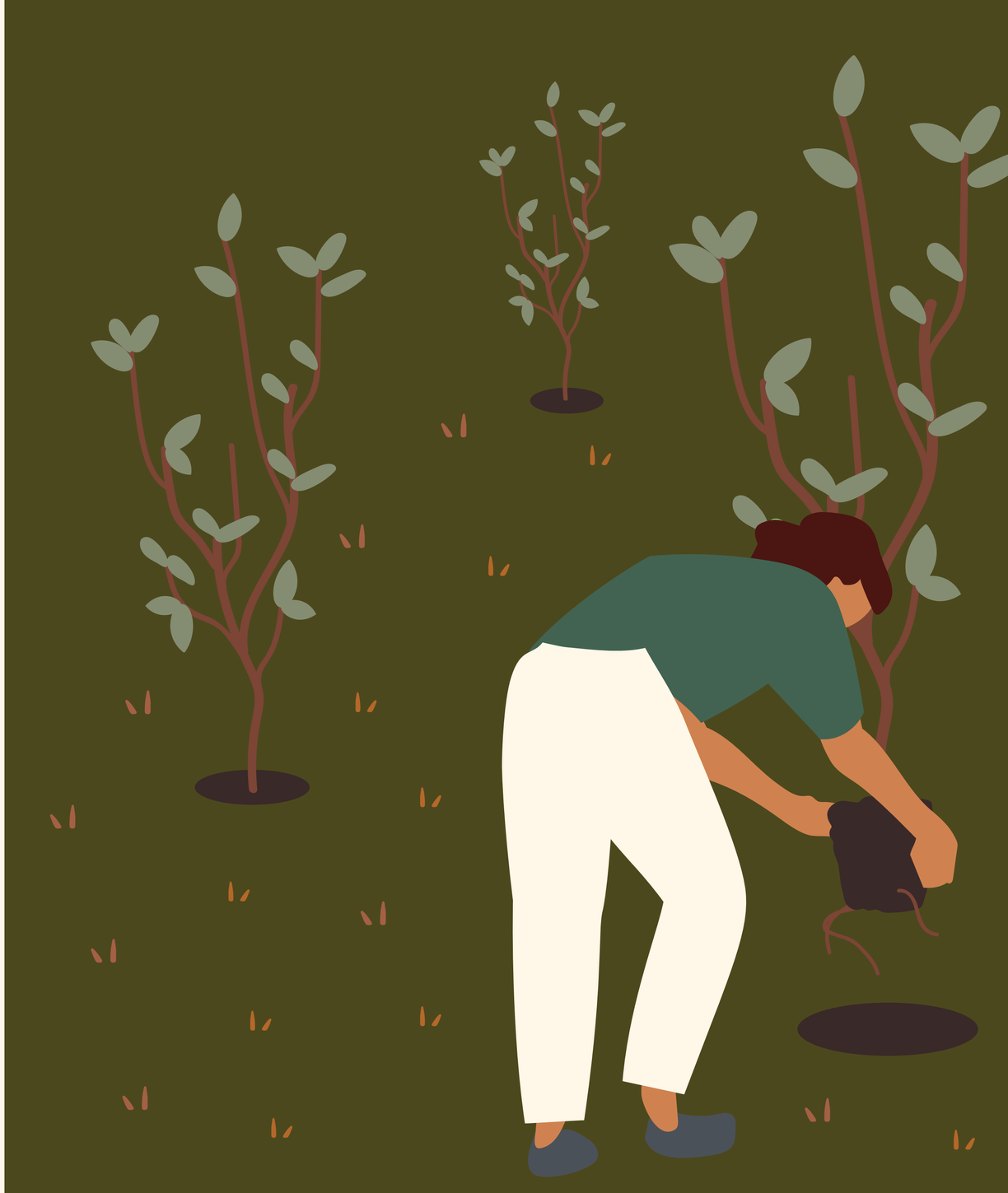
4. **Initial results:** Conclusions are discussed and expressed as an initial output giving an overview of basic degree of awareness of the issue among the people and sectors surveyed, and highlighting some of the perceptions and approaches that emerged. A stocktaking meeting is held to define the next steps, once the main approaches derived from the survey have been clarified. Highlight the degree of information or misinformation about climate change among the surveyed groups. And the most interesting alternatives they proposed.

PARTICIPATORY WORKSHOP TO SHARE RESULTS AND COORDINATE ACTIONS

2. Example of an interdisciplinary activity on climate change

Once the initial results are obtained, Observatory students meet to organise: a participatory workshop to share the results of the survey and coordinate next steps. Representatives of the media, youth leaders, community organisations, associations, etc. could be invited to the workshop.

The aim of the workshop is to disseminate the results and listen to suggestions for possible joint activities to improve public awareness of climate change and the assumption of future responsibilities. Participants' contributions form the basis of an agreement for action, based on the importance of joint action between different social and economic sectors, bringing the individual to the collective. The Observatory will offer to promote and monitor this agreement.



Evaluation of the activities carried out

The Desirable Scenario designed in the Interdisciplinary Roundtable is taken as the main reference for evaluating the activities carried out. In the case of Climate Change, this was: "An Observatory reveals the degree of local knowledge and awareness of climate change, as the first step for future actions to raise awareness on the subject." For evaluation purposes, two main objectives can therefore be considered to have been pursued:

- *Find out the level of the local population's knowledge and awareness of the issue*
- *Plan future awareness-raising actions.*

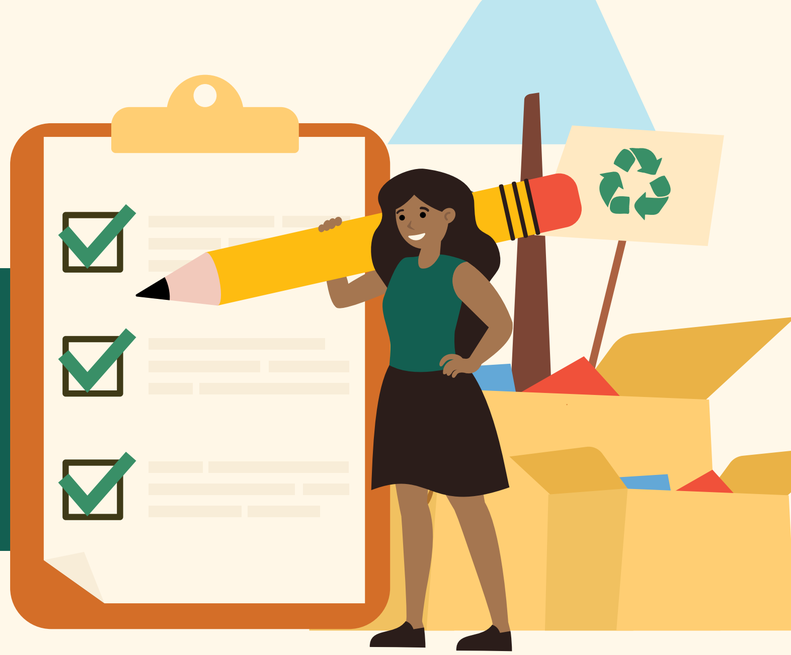
In order to evaluate the activities carried out, the group can start from four general criteria, specified through specific indicators developed in the educational centres, according to the different educational levels, ages and subjects, and based on established pedagogical approaches.

EVALUATION CRITERIA	MAIN FOCUS	CENTRAL THEME: CLIMATE CHANGE						
		ACTIVITY 1. School Climate Change Observatory			**ACTIVITY 2.** Participatory workshop			**COMMENTS AND PROPOSALS**
		LEVELS			LEVELS			
		HIGH	MEDIUM	LOW	HIGH	MEDIUM	LOW	
KNOWLEDGE *Climate change, global warming, greenhouse gases, mitigation, adaptation.*	*Extent to which understanding of key issues has been achieved*							
PARTICIPATION, INTEREST *Participatory design and survey application. Contributions from students and teachers*	*Level of participatory process, motivation and commitment*							
OUTPUTS OBTAINED *Survey forms and applied results Conclusions document*	*Achievement of visible, concrete results*							
FOLLOW-UP PROPOSALS *Action agreement*	*Presence of new ideas, projects and suggestions*							

SUSTAINABLE CONSUMPTION

SUSTAINABLE CONSUMPTION

- To provide information about sustainable consumption to be applied in educational processes
- Highlight some elements that can contribute to better consumption at local level.



CONSUMPTION

Actions, and their related effects, undertaken to satisfy present or future human needs, and which form part of the economy. Consumption is linked to human actions or expenditures needed to acquire food or goods or payments for services within a society, and therefore establishes a constant production dynamic. When this action exceeds the purchase necessary for a dignified life, sometimes involving excessive or unnecessary expenses, it is known as “consumerism”, which is considered to be one of our contemporary social, economic and environmental problems.

By 2050, the global human population is expected to reach 9.7 billion people, which is 33% more of us than in 2015[112]. Population growth will generate a significant increase in the demand for resources and materials to meet future needs, which poses a fundamental challenge: we need to establish more sustainable patterns of consumption and production.

SUSTAINABLE CONSUMPTION AND PRODUCTION

These concepts involve the use of services and products that respond to basic needs and provide a better quality of life while minimising the use of natural resources and toxic materials, as well as waste and pollutant emissions during the lifecycle of the service or product, so as not to endanger future generations’ needs[113]. It translates into a better quality of life for all and also allows for an increase in competitiveness and a reduction of economic, environmental and social costs. See more on Sustainable Development Goal 12: Responsible consumption and production.

[112] United Nations. (2021). Shifting Demographics: United Nations. https://www.un.org/en/un75/shifting-demographics

[113] United Nations. (2021). Sustainable consumption and production. https://www.un.org/sustainabledevelopment/en/sustainable-consumption-production/

Basic concepts;

UNSUSTAINABLE CONSUMPTION

Is significantly related to the unsustainable growth of industry, resource extraction, waste generation, energy misuse, pollution and the destruction of ecosystems. Current production generates intense demand for resource extraction to be used in production and satisfaction, and has significant social and environmental impacts. While industry is responsible for transforming production processes and greening value chains, the consumer has a key role to play in the transition to sustainable consumption and production patterns. As an instrument of transformation, environmental education contributes significantly to our ability to build societies committed to caring for the environment and to creating sustainable patterns of consumption.

CIRCULAR ECONOMY

A circular economy is one of today's sustainable economic models. In this system, products and materials are designed in such a way that they can be reused, remanufactured, recycled or recovered and thus maintained in the economy for as long as possible, together with the resources from which they are made, avoiding/designing and minimising the generation of waste, especially hazardous waste, and greenhouse gases and emissions are preventing or reducing greenhouse gases, which results in a significant contribution to sustainable consumption and production and reduces the adverse effects of climate change.[114]

It can be understood as an economic system that maintains the value of products and materials, and in which systems are improved, enabling human and environmental well-being. Under a circular (not linear) system, based on the principle of "closing the lifecycle loop" of products, services, waste, materials, water and energy. [115]

SUSTAINABLE LIFESTYLE

A **"sustainable lifestyle" is a set of habits and behavioural patterns embedded in a social context and enabled by efficient institutions, regulations and infrastructure that frame individual choices, in order to minimise the use of natural resources and the generation of waste and pollution, while supporting justice and prosperity for all.**[116] Sustainable lifestyles are embedded in all human interactions, and can be included in five overarching domains: food, housing, transport, shopping and leisure. Sustainable lifestyles vary by context and conditions. Access to sustainable habits is a prerequisite for a healthy planet for future generations. Each and every one of us has an impact on the world. Sustainable lifestyles are therefore essential to our pursuit of happiness and are at the heart of sustainable development.

[114] Working definition of circular economy based on the United Nations Environment Assembly (UNEA-4) resolution on Sustainable Consumption and Production (UNEP/EA.4/Res.1).

[115] Fundación para la Economía Circular (Foundation for the Circular Economy). (2017). Fundación para la Economía Circular (Circular Economy Foundation). https://economiacircular.org/

[116] United Nations Environment Programme. (2014). ¿Qué son los estilos de vida sostenibles? (What are sustainable lifestyles?) https://www.oneplanetnetwork.org/sites/default/files/10yfp-sle-brochure-es.pdf

Our connections with consumption:

Human beings make thousands of decisions throughout their lives. For those fortunate enough to have a choice, such decisions can make a big difference. What to eat? Where to live? What form of transport to use to get about? Which clothes to wear? How to use free time?

Regardless of how we answer these questions, the way we ultimately live, or, in many cases, are forced to live, has an impact on our planet. In many parts of the world the amount of stuff (resources) we use to live is increasing, affecting planetary boundaries and the health of the environment.

Our relationship with consumption has developed since the beginning of time, because of human needs. Consumption is essentially linked to survival: being able to feed oneself, protect oneself from the environment, move from place to place, and enjoy leisure. From this “essential for life” perspective, natural consumption is sustainable. Many civilisations throughout human history testify to harmonious relationships with nature and their habitat. For this reason, it is interesting to resuscitate the original concept of natural relations, to **see ourselves as part of nature** and to think about consuming only what we really need: that which is necessary for a dignified life.

Social and economic relations with consumption have changed over time. The expansion and industrialisation of production processes, accompanied by increased advertising, have generated a series of social pressures pushing people to purchase new goods and services, leading many populations to an unsustainable relationship with consumption, and often leading to consumerism.

In addition to inequality between countries, there are also inequalities between the consumption patterns of different income groups. The lifestyles of the richest **10% of the world's population (broadly speaking, most middle-class people living in industrialised countries) are responsible for almost half of global emissions, while the lifestyles of the wealthiest 1% are responsible for about twice as many emissions as their poorest fellow humans 50%** (Oxfam, 2021).

This means we need to move lifestyles into a fair consumption space, so over-consumers will have to shift their consumption practices and reduce their consumption within biophysical limits, allowing under-consumers to use some of the freed consumption space to increase their own consumption and ensure universal health, well-being and dignity.

Informed groups of people are increasingly interested in moving towards a new form of consumption, more closely linked with what is necessary, sustainable and socially just. National governments and cities have declared a climate emergency on the basis of IPCC evidence.[117] With less than ten years to halve global GHG emissions, decisive action is needed.

Moving towards sustainable consumption will require a broad change in values and aspirations and an enabling environment of programmes and infrastructure to support these changes. These strategies will also contribute directly to related agendas such as social justice and the circular economy. Such movement requires commitment by governments, businesses, investors and other institutions that shape the rules and socio-technical context, as well as by individuals.[118]

[117] IPCC (2021) Climate Change 2021: The Physical Science Basis
[118] Akenji and Chen (2016) A Framework for Shaping Sustainable Lifestyles,

Context in Latin America and the Caribbean:

The Latin America and the Caribbean region consumes more than 9% of the planet's natural resources and generates 6.7% of global GDP[119]. Resource use is generating significant environmental and human health impacts. In terms of the region's energy matrix, the electricity, industry and transport sector is responsible for 35.2% of the region's GHG emissions[120]. To learn more about this sector visit UNEP's latest report Is Natural Gas a Good Investment for Latin America and the Caribbean?

Decarbonising the economy involves the production of electricity from renewable sources and the transition to electric mobility based on the use of energy sources other than fossil fuels. Latin America and the Caribbean must promote investments in sustainable infrastructure and practices that ensure resource efficiency in all economic activities. The region has the opportunity to steadily decrease its material footprint by increasing added value, and following more sustainable trajectories.
As one of the regions most affected by biodiversity loss related to land use, the focus should be on the economic sectors that contribute most to such loss, such as agriculture, food and beverage processing and wood and paper production.[121]

Recommendations for decoupling economic growth and resource use include **adopting a systemic approach** and **achieving cooperation between value chain actors** from the **producer to the end consumer**, including by raising consumer awareness through education, and by providing adequate information through labelling and use standards. Accompanied by the standardisation of extended responsibility across production chains.

Other measures include eliminating or reducing fossil fuel subsidies and other distortions that result in inefficient resource use and hinder cleaner technology and input penetration.

We need major changes in the way we live to address current threats and deliver the SDGs. Policymakers can take decisive action, because individuals do not have the capacity to change the interlocking systems that meet our daily needs and allow us to achieve our aspirations[122]. Strategies covering individual economic sectors and lifestyle domains are required. Both national governments and individuals can establish these strategies to promote and facilitate pathways to future sustainable lifestyles.

Finally, efforts must be made to revalue ancestral knowledge and regional customs within a framework of respectful consumption and responsible management of natural resources, considering the survival of future generations.

[119] Economic Commission for Latin America and the Caribbean. (2013). Recursos naturales: situación y tendencias para una agenda de desarrollo regional en América Latina y el Caribe (Natural Resources: Situation and Trends for a Regional Development Agenda in Latin America and the Caribbean). Contribución de la Comisión Económica para América Latina y el Caribe a la Comunidad de Estados Latinoamericanos y Caribeños (Contribution of the Economic Commission for Latin America and the Caribbean to the Community of Latin American and Caribbean States.) https://repositorio.cepal.org/handle/11362/35891
[120] UNEP (2019) Zero Carbon. https://cambioclimatico-regatta.org/index.php/en/documents-and-tools/category/informe-carbono-cero
[121] Global Material Flows Database(2019) http://www.resourcepanel.org/global-material-flows-database
[122] Akenji et al. (2021) 1.5–Degree Lifestyles: Towards A Fair Consumption Space for All

Thematic contributions

Mathematics:

- Establish the systemic relationships and connections between consumption and the various biodiversity components: water, air, soil, climate change, waste and energy. Create a graph showing these links.

- **Help students do the accounts for their daily activities at home, their expenses for both essential and unnecessary basic items such as food or transport, clothing and footwear. Investigate the sustainability and fair trade status of each item.**

Natural Sciences:

- Invite the class to evaluate consumption of organic or non-organic food, and underscore the importance of considering all the details related to health, good family nutrition and sustainability.
- Research the health benefits of low-carbon diets. Along with their environmental benefit and cultural aspects.
- Analyse the chemical components of pesticides commonly used locally or nationally, and their impact on food and agricultural soil. Highlight the importance of these facts for consumption-related decisions.
- **Research and map the "journey" or transport made/used by certain foods to reach our table. How many intermediaries are involved? Is there loss and waste? How does this affect producers?**

Example

Language and Literature:

- Analyse how language can be used to promote unsustainable consumption, fostering images or symbols of belonging to certain social groups, in order to obtain economic gains and unnecessary purchases.
- Study a few "marketing" expressions, phrases or words in another language (often English) used to persuade the consumer to buy the good or product, assuming it is good quality. Invite the class to write opposing sentences to the arguments studied to raise consumer awareness and promote sustainable consumption.
- **Identify articles, books or documentaries that include different visions and indigenous community lifestyles.**

Example

Social Sciences:

- Discuss the issues related to consumerism: a social phenomenon driven by socio-economic pressures and its adverse effects on the environment with the students. Watch relevant documentaries and videos on this subject.

- Underline the importance of a clear awareness of the social circumstances that accompany our current, unsustainable development processes. Explain some of the reasons why people feel pressured or influenced into certain types of consumption. Encourage students to think critically about their consumption habits, when shopping.

- **Help children reflect on the multiple actions and movements being generated to protect our resources, in a positive and proactive way. Reduce their levels of environmental stress, and help transform their concerns into proposals for improvement.**

Example

The Arts:

- Describe and show some artistic products made by indigenous peoples or community groups, which are based on the good use of natural resources, and which can be seen as recommendable for sustainable consumption. For example, tapestries dyed with natural dyes, embroidered fabrics, paintings using natural pigments, etc.

- Examine the diverse arts based on natural products and continuing traditions of great cultural value produced by some peoples, and their relation to local or regional sustainable consumption. Encourage the students to create paintings or posters to promote these artforms.

- **Promote classroom spaces for the recovery, repair and reuse of clothing. Encourage swapping to reduce new purchases.**

Example

Physical Education:

- Demonstrate the importance of cycling, rollerblading and other body-powered means of transport, as part of good physical exercise, and as examples of healthy living for sustainable consumption. Promote the use of public transport as a more efficient way of getting about than private cars.

- **Remind the class that we need to eat foods that give us strength and health, especially when these do not contain pesticides. Underline the importance of being healthy people with sufficient judgement and strength to make decisions. Emphasise that caring for your health is great preventive medicine.**

Example

Potential interdisciplinary activities

Once teachers have made their subject contributions for classroom use, the Interdisciplinary Committee meets to design and agree on a common Desirable Scenario. For example:

"Students understand the importance of sustainable consumption, and analyse the role of advertising in social decisions about consumption".

Once some details and scopes of the scenario have been drafted and specified, interdisciplinary activities are organised to achieve it at the educational centre and/or in the community.

PARTICIPATORY STUDY ON ADVERTISING AND CONSUMER DECISIONS

Main theme and focus:
Students could carry out a participatory study on the role of advertising locally and/or nationally, in making (sustainable or unsustainable) consumption decisions. Advertising is understood as the set of messages broadcast (by radio, television, internet, posters, magazines, newspapers, flyers, etc.), with commercial interests that seek to make people buy and use certain products or goods.

The focus should be designed to help students study the characteristics of such messages, in terms of their target groups (women, men, boys and girls, adolescents and young people, retired people, or the general public), the type of products they promote (sustainable or unsustainable) and the resources used to achieve their objective. The aim is to clarify any (positive or negative) influence advertising may have on the area where the school is located. And to relate this to the importance of promoting genuinely sustainable consumption.

Main phases and activities:

1. **Preparatory phase:** With the agreement of the education authorities, a small interdisciplinary group of teachers proposes a participatory workshop to allow students at various levels to carry out a study on the subject of advertising and consumption, explaining that the aim is to analyse the local consumption situation and the actions possible to make the area more sustainable and environmentally friendly. This task could be voluntary but, if well-designed, could be of great interest to students.

2. **Organisational phase:** Once the group of volunteers has been formed, explain that they will take part in a study on the impact of advertising locally, in order to raise awareness about the consumption patterns of the families and social groups in the community. Participants are then asked to bring in various advertising materials from home (newspapers, magazines, posters) related to the consumption of various products and goods. They are also asked (where possible) to take pictures of posters, or advertisements they see on TV referring to these issues, as well as recordings of radio ads, or online publicity (social media, news, etc.), if they have easy access to them. The teachers do the same, in order to provide an interesting range of items for study.

3. The implementation phase of the participatory workshop: The group of teachers divides the students into four or five working groups, depending on the total number of participants. The advertising materials collected are distributed, and the groups are asked to analyse and compare them, looking at the following aspects (which can be expanded or reduced): fields of advertising interest; target audiences; images and focus:

- **Fields of advertising interest:** a. Clothing and footwear; b. Food; c. Grooming and beauty products; d. Material goods (e.g. cars, TVs, mobile phones, video games, toys, etc.)
- **Target audience:** a. Women; b. Men; c. Boys; d. Girls; e. Youth and Adolescents; f. Older people.
- **Images and focuses:** a. Type of people shown in the advertisements (local, international, etc.); b. Main focus to grab attraction; c. Most common words used to "convince".

They are given a simple table (shown below) to allow them to first establish the relationships between the fields and the target groups, by filling in the relevant details in each case, for example, teenagers - clothing and footwear (smart clothes, sports shoes, etc.), boys, girls - food (hamburgers, ice cream), goods (toys), clothing, etc.

Fields **Addressees**	Clothing and footwear	Food	Grooming and beauty products	Material goods
Women				
Men				
Boys				
Girls				
Young people and teenagers				
Older people				

Once this task is complete, they are asked to analyse the details shown in the table, such as:

- What differences can you observe between advertising that targets men and advertising that targets women?
- What aspects were used most often for women and which for men?
- What items are especially targeted at children? And girls?
- What kind of goods are advertised to adolescents and young people?

Start a class discussion about what they have observed in the materials, answering questions such as:

- Which images were used most frequently? What type of image? And what kind of people or places were shown?
- Which words were used to convince people to buy the product? Were any foreign language words used?
- Were there any messages promoting sustainable consumption?

Based on these comments, ask the students to *write down the group's main conclusions,* so that these can be presented along with the table of results, for sharing and comparison with the other groups. Conclude with a series of recommendations to improve the situation and progress towards sustainable consumption.

4. **Conclusions of the participatory workshop phase:** After the presentation of the groups' results, tables and conclusions, open a debate to reach the final conclusions and collective recommendations. The group agrees to carry out a specific action to raise awareness of the facets of advertising and its relationship with local consumption. For example, the group could make a presentation about the situation and its relation to sustainable or unsustainable consumption to the educational community. Raise potential actions to improve on the findings, and emphasise local, sustainable consumption.

PRESENTATION ON THE SUBJECT OF ADVERTISING AND CONSUMERISM TO THE EDUCATIONAL COMMUNITY

Main theme, approach and guidelines:

A school presentation to raise awareness of the importance of sustainable consumption and the situation regarding advertising is organised with the participation of the educational community, to publicise the student study on advertising and local and national consumption, its conclusions and recommendations.

Start with a short introduction by a staff representative, explaining the topic of sustainable consumption, highlighting its importance and relation to sustainable development, and the need to progress towards a healthy, values-driven and ethically responsible life. Subsequently, the same person or another teacher provides an overview of the students' work in the participatory workshop, for example, covering the materials used, fields of interest, target groups and the images and guidelines analysed.

The floor is then given to a delegate representing the groups that took part in the study, so that they can explain the content of the tables and their similarities and differences. A group delegate then expresses the conclusions and recommendations. The floor is opened to parents, students and other participants to allow them to express their opinion about the results. This phase allows people to exchange opinions and suggestions.

The session conclusion is designed to achieve general agreement between the participants, with the aim of moving towards sustainable consumption. And the students are thanked and encouraged to continue to contribute ideas.

Evaluation of the activities carried out

The Desirable Scenario designed in the Interdisciplinary Roundtable is taken as the main reference for evaluating the activities carried out. In the case of consumption this was: "Students understand the importance of sustainable and fair consumption and analyse the role of advertising in social consumption decisions". For evaluation purposes, two main objectives can therefore be considered to have been pursued:

- Analyse consumption from the point of view of the influence of advertising
- Clarify the issue to improve the education community's awareness

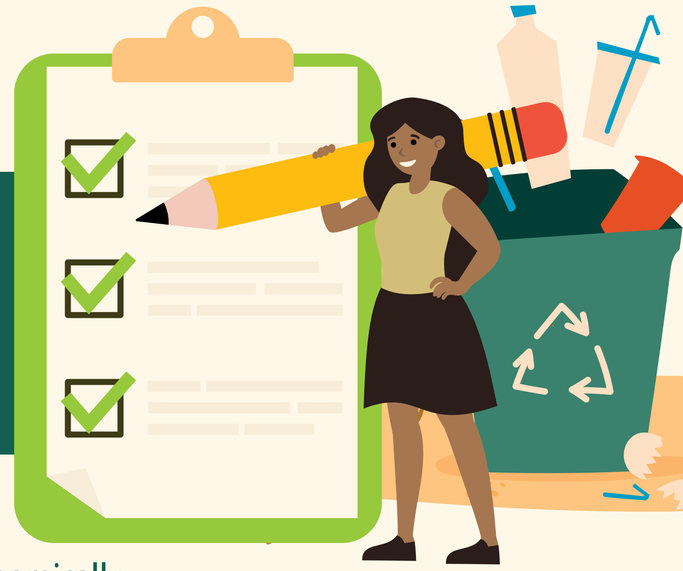
Four general criteria could be used to evaluate the activities carried out. These can be developed into specific indicators at the educational centres, according to the various educational levels/ages, different subjects and based on the established pedagogical approaches.

EVALUATION CRITERIA	MAIN FOCUS	CENTRAL THEME: SUSTAINABLE CONSUMPTION						
		ACTIVITY 1. Participatory study on consumption and advertising			**ACTIVITY 2.** Presentation of results to raise awareness			**COMMENTS AND PROPOSALS**
		LEVELS			LEVELS			
		HIGH	MEDIUM	LOW	HIGH	MEDIUM	LOW	
KNOWLEDGE *Consumption. Sustainable consumption and production*	*Extent to which understanding of key issues has been achieved*							
PARTICIPATION, INTEREST *Creation and participation in the interdisciplinary group; incorporation of volunteers, thematic contributions*	*Level of participatory process, motivation and commitment*							
OUTPUTS OBTAINED *Design of relationships table; results and conclusions of the participatory analysis workshop.*	*Achievement of visible, concrete results*							
FOLLOW-UP PROPOSALS *Gather opinions and agreements*	*Presence of new ideas, projects and suggestions*							

WASTE MANAGEMENT

WASTE MANAGEMENT

- Raise awareness of the main aspects of solid waste and solid waste management, as well as the impacts of poor management.
- Propose a diagnosis or audit of the school's solid waste to improve awareness and encourage good management.



SOLID WASTE

Material discarded after it has fulfilled a purpose or mission, but that could be used later, reused, recycled. Any waste can be put back into use with good management. Waste can be organic or inorganic. Inorganic waste includes: bottles (plastic or glass), cardboard boxes, paper, etc.

Solid waste is currently seen as one of the most serious global problems. According to a World Bank report[126] solid waste management affects everyone, whether individuals manage their own waste or governments provide citizens with waste management services. Waste generation is estimated to increase from 2 billion tonnes in 2016 to 3.4 billion tonnes in 2050 as nations and cities urbanise, develop economically and populations grow. Worldwide, at least 33% of this waste is being mismanaged, left in open dumps or burned.

URBAN SOLID WASTE

is generated in urban spaces and their related areas. This kind of waste is produced by households, offices, warehouses, shops, businesses, etc.

[126] The World Bank Group. (2021). What a Waste. https://datatopics.worldbank.org/what-a-waste/

Basic concepts:

HAZARDOUS WASTE

poses a risk to society or nature. It includes e-waste, batteries, old phones, etc.

INTEGRATED SOLID WASTE MANAGEMENT (ISWM)[127]

It is the dynamic interactions between institutional, sectoral and regional actors to find an efficient and equitable waste management solution. Public policies are required to strengthen waste management processes in urban spaces, following an important series of steps starting with the importance of people sorting the waste they generate, followed by the waste collection and transport process, followed by a process that includes classification, use, possible treatment and final disposal.

Special care is required during final disposal to ensure that these sites do not become polluting spaces, as in the case of open dumps, which are home to all kinds of waste, including hazardous waste, dumped without prior treatment, and cause serious problems. Here, it is particularly important that we consider our consumption of products and goods in the light of sustainability criteria, and promote re-use. An important principle, known as the 5Rs, is being promoted to support this:

[127] Rondón Toro, E., Szantó Narea, M., Pacheco, J. F.-C. E.-G. A., Contreras, E., & Gálvez, A. (2016, 1 July). Guía general para la gestión de residuos sólidos domiciliarios (General Guidance on Solid Household Waste Management). Economic Commission for Latin America and the Caribbean. https://www.scribd.com/document/399926480/Guia-General-Para-La-Gestion-de-Residuos-Solidos-Domiciliarios-Cepal

THE 5 R'S PRINCIPLE

This principle emphasises the need for everyone to perform five (5) fundamental tasks: reduce, reuse, recycle, refuse, repair.

- **Reduce:** rethinking our purchases by asking do I really need this to avoid buying unnecessary products and limit our consumption to the essentials.
- **Reuse:** extending a product's useful life by giving it a new purpose (for example, an old T-shirt can be re-purposed as a kitchen towel, glass bottles as food storage containers).
- **Recycling:** is the process of treating waste as a raw material that can be turned into something new (for example, Plastic bottles, paper, aluminium and glass can be processed to create new plastic, paper, aluminium and glass).
- **Refuse:** means saying no when offered a product that has negative impacts on the environment.
- **Repair:** making the necessary changes and fixes to an item in poor condition to allow it to continue to be used.

ZERO TRASH

This movement is both a principle and a comprehensive approach to waste management that aims to gradually reduce solid urban waste to zero waste. Various measures are considered at each stage, from production to consumption and disposal. It also includes designing products with a long service life, and the production of materials that are easily reinserted or recycled.

Our connections with waste

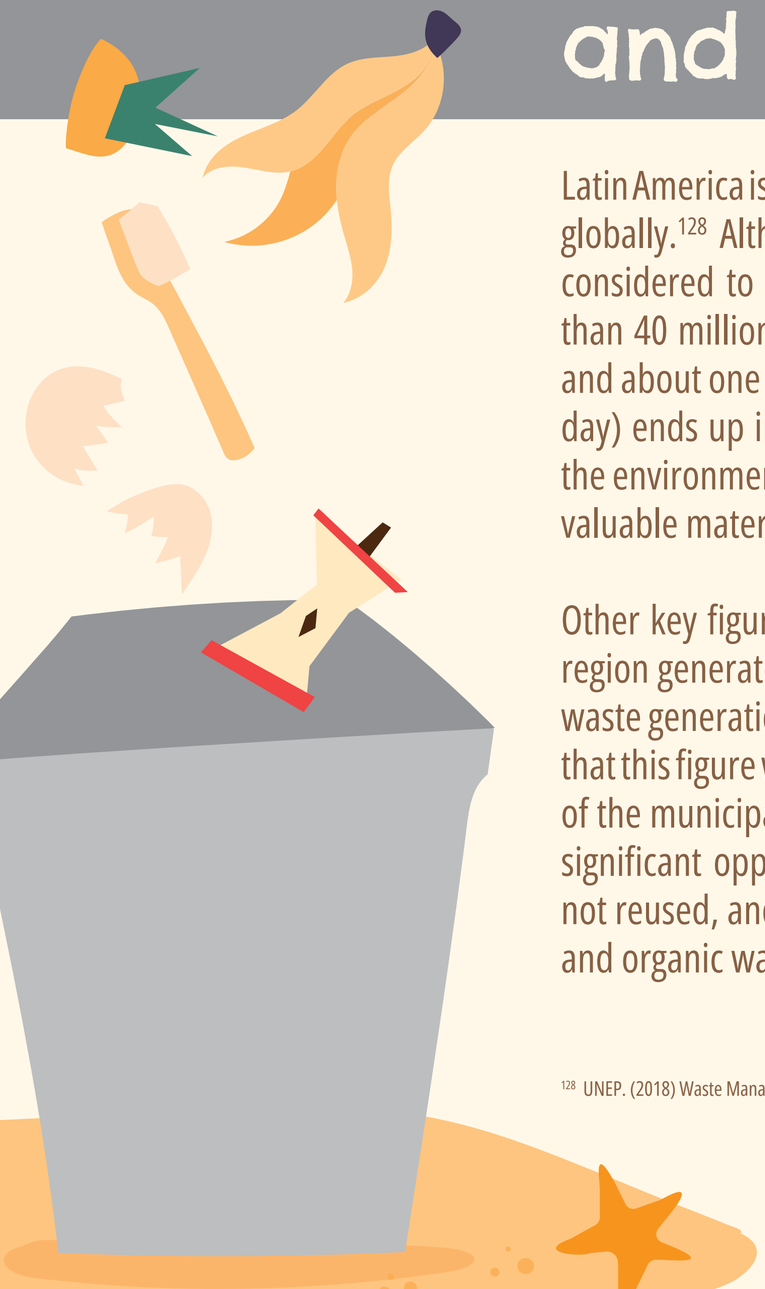
Human beings should have a relationship with solid waste that reflects the natural world. In nature, everything can be reused, everything rotates in cycles that feed back into each other. At some point in human history, this natural relationship worked: we made careful, moderate use of nature's resources and our activities left few impacts. However, accelerated changes emerged.

With the beginning and development of the Industrial Revolution towards the end of the 18th century and in the beginning of the 19th century, a transcendental economic change took place. Urbanisation and industrialisation increased, leading to very visible, notorious new situations related to what was then considered to be development. Although this revolution is seen as an important moment in our history, due to the technological, economic and sociological changes it brought about, it is also worth highlighting its close relation to the environmental problems that arose as industrial processes expanded. **These problems include the consequences of excessive solid waste and the lack of appropriate waste management.**

It is now clear that the emergence and enormous growth of solid waste are related to prevailing social and economic processes, where its potential impacts have not been fully, seriously and efficiently considered. And the importance of sustainable development has not been taken into account. However, significant efforts are currently being made in this direction.

Some indigenous peoples and rural communities maintain a more balanced and harmonious relationship with nature. This means that they do not generate abundant waste, instead using their waste in a balanced way as part of structured planting and cultivation processes. They have not been unaffected by external influences, but their actions maintain a sustainable approach and go hand in hand with a caring and respectful vision of Mother Earth. We need to learn from this wisdom, as an essential part of returning to our essential selves, and as a contribution to a sustainable world.

Context in Latin America and the Caribbean



Latin America is the source of approximately 10% of the waste generated globally.[128] Although waste collection and management systems are considered to have been gradually improving in recent years, more than 40 million people lack access to basic waste collection services, and about one third of the waste generated (some 145,000 tonnes per day) ends up in open dumps, causing serious impacts on health and the environment. Waste recovery is still very low at only 10% - so many valuable material and energy resources are wasted.

Other key figures show the current situation: every inhabitant in the region generates 1 kg of waste per day, which represents a total daily waste generation of 541,000 tonnes of municipal waste. It is estimated that this figure will increase 25% by 2050. However, approximately 50% of the municipal waste generated in the region is organic, providing a significant opportunity for reduction. Currently 90% of this waste is not reused, and separation at source and segmented collection of dry and organic waste is a major challenge.

As are open dumps, which still operate in the region and receive approximately 145,000 t/day. These landfills create health risks for the people who work in them, and for the population in the surrounding areas. They also produce other environmental impacts by polluting water and soil, emitting toxic gases and GHGs, with consequences for various sectors.

The waste collection service needs improvement, to make it available to all urban dwellers, as it is estimated that 35,000 tonnes of waste go uncollected in the region every day. **A key recommendation is to formalise and recognise informal recycling, as many people work to recover waste without a formal contract or recognition.**

A fundamental approach is needed to improve the situation of integrated solid waste management in the region: publicity and promotion are required to ensure the effective participation of everyone in society. The role of environmental education is therefore of the utmost importance, in connection with the promotion of more and better political and regulatory measures, at government and municipal level.

[128] UNEP. (2018) Waste Management Outlook for Latin America and the Caribbean

Thematic contributions

Mathematics:

- Explain how long[132] it takes for various materials to decompose naturally, and do some calculations using common materials.

- **Remind students of remainders in maths, in an inexact division. Underscore the importance of not leaving behind waste that will affect the life of the planet.**

[132] Example: Organic waste: 3 weeks to 4 months; Cotton and/or linen clothing: 1 to 5 months; Woollen socks: 1 year; Leather shoes: 3 to 5 years; Paper: 3 weeks to 2 months; Tin cans: 10 to 100 years; Aluminium cans: 350 to 400 years; Plastic materials: 500 years.

Natural Sciences:

- Indicate the problems arising in soil, water and air caused by solid waste and its poor disposal. The impacts of hazardous waste, such as batteries. Analyse the impact of e-waste.

- **Explain what happens to seas, lakes or rivers when waste, especially plastic bags, is dumped. Impact of microplastics and how they affect marine life.**

Example

Language and Literature:

- Explain the differences between the words “waste” and “rubbish”. Analyse the ways in which these words are used, and their respective connotations.

- Invite the students to come up with acrostics based on the words: recycle, reuse, etc.

- Analyse and design positive environmental messages, emphasise the power of language in bringing about behavioural change.

- **Analyse the use of language in creating awareness-raising campaigns. Ask students about their best environmental videos and campaigns. What kinds of messages are the most convincing?**

Social Sciences:

- Point out that it is everyone's responsibility to care for the planet, and highlight the simple actions we can all perform to avoid waste generation.
- Investigate how other communities or cities managed solid waste. Analyse the strategies and techniques used in ancient times, as well as waste management in other countries.
- **Observe or comment on the historical processes that have led to the increase of solid waste in the world, and the need for social and economic changes.**

The Arts:

- Make paper creations, using origami and other paper-folding techniques, to illustrate the potential uses of paper recycling.
- Teach simple ways of making paper out of recycled newspaper, or the use of dough to make dolls, puppets, etc.
- Create homemade recycled paper.
- Encourage the reuse of materials for school activities.
- **Create a collection centre for forgotten or old stationery, papers, etc. for classroom use or donation.**

Physical Education:

- Highlight the importance of not contaminating sports areas, such as gymnasiums, athletics tracks, swimming pools and others, with solid waste.

- Create a five-minute litter pick-up rule for outdoor activities, for example sport in parks, beaches, protected areas. Encourage this practice, and organise clean-up championships or marathons at local beaches or green areas.

- **Point out the importance of solid waste management at physical exercise centres, as water bottles are always needed for hydration, and it is important to know where to put the empty containers. Emphasise the importance of replacing plastic bottles with non-polluting packaging.**

Example

Potential interdisciplinary activities

Once teachers have made their subject contributions for classroom use, the Interdisciplinary Committee meets to design and agree on a common Desirable Scenario. For example:

"Students carry out an initial green-school diagnosis to become aware of the importance of proper solid waste management and improve their attitudes and behaviour".

Once some of the details, approaches and scopes of the Scenario have been drafted and specified, organise interdisciplinary activities to celebrate and educate people in this subject at the educational centre and/or with the community.

“GREEN SCHOOL SOLID WASTE MANAGEMENT DIAGNOSIS”

Main theme and focus:
Understand, assess and improve solid waste management at the school. To this end, students could carry out an initial green school diagnosis, in this case focusing on solid waste, in order to promote better and greater knowledge of this field, as well as to encourage the improvement of students’ knowledge, attitudes and behaviour.

A green school diagnosis is an educational process that aims to improve environmental management at education centres by gaining an understanding of internal processes, including various managed processes such as: water use, energy use, green spaces (school gardens, etc.) and solid waste.

To make it easier to distinguish the various aspects, such diagnoses can be referred to as GREENWATER, GREENENERGY, GREENSPACE and GREENWASTE (as in the present case of solid waste). Systematically articulating all of these processes and any others the students suggest, will enable a more complete green school diagnosis, capable of helping to improve environmental management at the school.

Fases y actividades principales:

1. **Preparatory phase:** It is important that the school has recycling bins to enable the correct separation of solid waste. If there are no such bins at present, the first task is to build some using simple materials.

   Waste separation varies from country to country, as do the distinctive colours for each waste category. For example, containers for glass are often green; paper and cardboard - blue; organic waste - orange; plastic bottles or cans - yellow; hazardous waste - red; other waste - grey. Students could make containers for the school out of cardboard, adding the respective names and colours.

   Hold a meeting with a group of teachers and school administration staff to review the situation of solid waste management at the school, along with teacher, administrator, student and staff habits, etc. The school may have already started a campaign on sustainable use and disposal of waste; if so, this diagnosis can be a continuation of the process.

   Carry out a “waste audit” over one to two weeks. Assess the type (organic waste or inorganic waste) and the amount of waste (weight) generated at the school. Locate the recycling collection centres

near the school and identify the types of materials they receive (glass, paper, etc). Note their conditions for receiving this waste.

Lead a series of introductory and explanatory classroom talks to make students aware of the type of separation to be carried out, to ensure they know which containers are for which materials, and to underline the importance of placing the corresponding waste in the right containers.

2. **Organisational phase:** Invite a group of volunteer teachers and students to share ideas on the best ways to carry out a green solid waste management diagnosis, in such a way as to motivate their active participation in the process. Subsequently, explain the importance of surveying the entire school to gain a solid foundation for diagnosis:

3. **Survey design phase:** Define the questions to be included in the survey as a group, and according to the characteristics of the school. Questions may include the following:

- Do you know why solid waste management is important? Yes/No/A little (Explain)
- What kind of waste should be placed in the coloured bins?
- Green? Blue? Black, White? Red? Grey?
- Why is it important to place the right kind of waste in the right containers?
- When you need to dispose of rubbish in the classroom, what do you do?
- Do you try and find a bin for your rubbish in the playground? Yes/No/Sometimes
- Do the toilets have different containers for different types of waste? Yes/No
- Do you think that all schools/educational centres try and ensure people dispose of their waste properly? Yes /No/ Sometimes
- Do you find litter in areas around the school? Yes/No
- Do you think the school should also consider what happens around it in terms of waste management? Yes /No/Maybe
- Does the school recycle some of its waste? Yes/No
- Do you think it should? Yes/ No
- If yes, please tell us your ideas about how this should be done:

4. **Analysis of the survey outcome:** Once the list of survey questions has been defined and revised, it is handed out to all the students in the school during class so that they can answer them on the spot. The respective teacher collects the results, which will then be shared in a meeting with the other teachers and student volunteers involved.

   This meeting processes the survey results, highlighting the most salient issues, the majority answers and the suggestions made. This will provide a first version of the participatory green waste management diagnosis, and can serve as the basis for subsequent tasks.

5. **Conclusions and proposals**: A series of conclusions based on the analysis of the various issues is reached, and those considered to be of greatest importance under two priorities are highlighted:

- Those concerning levels of knowledge and awareness of the issue.
- Suggestions expressed.

On the basis of these two working guidelines, an initial action plan is drawn up to improve knowledge and awareness of the issue and to implement some of the main suggestions. This action plan will be presented at an extended school meeting to share the survey results, the conclusions and actions proposed. This meeting also allows the volunteers to listen to the community's opinions and additional or complementary ideas so that the meeting can arrive at a shared and approved plan.

ACTIONS TO IMPROVE SOLID WASTE MANAGEMENT AT SCHOOL LEVEL

2. Example of an interdisciplinary activity on solid waste

Based on the contents and results of the previous activity, an initial action plan is implemented to improve knowledge and awareness of solid waste management at the school, considering the results and suggestions obtained through the survey.

This first plan should be simple, easy to implement and monitor. Like any plan, it will include the following components: Objectives, strategies, tasks and deadlines (timeline), responsibilities, implementation, monitoring, follow-up and evaluation. Once the main actions have been designed and implemented, along with their monitoring and follow-up, results are assessed within approximately two to three months (in accordance with the planned time frame) in order to evaluate the plan and refine the themes and approaches, with a view to designing a second, more detailed and elaborate plan.

Another continuity exercise could include finding out about and contacting the original members of the Científicos de la Basura (Garbage Scientists)[133] initiative created in Chile in 2007. This group promotes the Red Latinoamericana de la Basura (Latin American Garbage Network) involving several countries in the region, especially Pacific Ocean areas. They have also developed and share interesting educational materials, including stories and research guides.

[133] Red Nacional de Investigación Escolar (National School Research Network). (2017). Garbage Scientists. http://www.cientificosdelabasura.cl/en/

Evaluation of the activities carried out

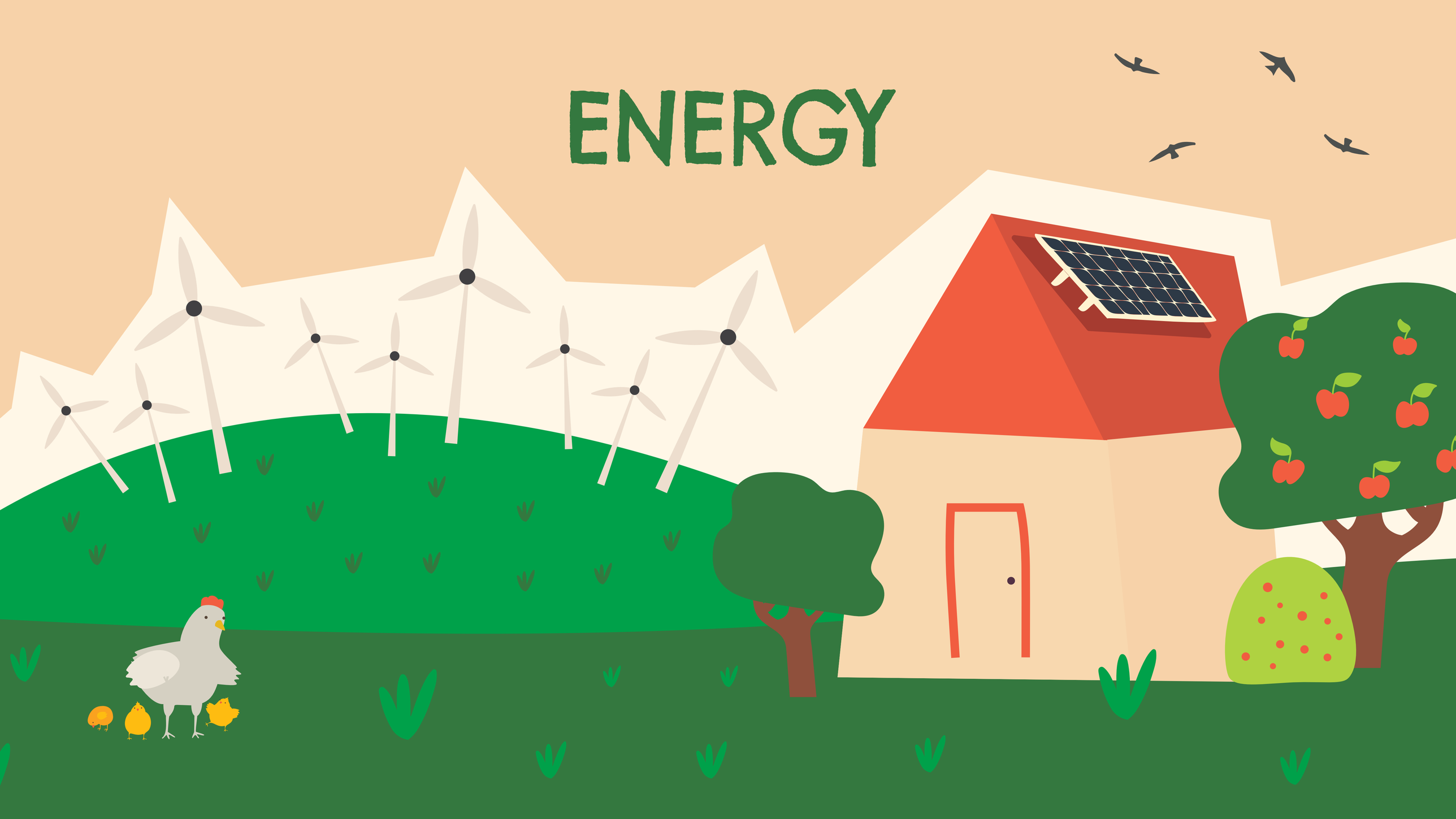
The Desirable Scenario designed in the Interdisciplinary Roundtable is taken as the main reference for evaluating the activities carried out. In the case of solid waste this was: "Students carry out an initial green school diagnosis in order to promote better and greater knowledge of this field, as well as to encourage the improvement of students' knowledge, attitudes and behaviour". For evaluation purposes, two main objectives can therefore be considered to have been pursued:

- Raise students' awareness of the importance of proper waste management.
- Improve students' attitudes and behaviour in this regard.

Four general criteria could be used to evaluate the activities carried out. These can be developed into specific indicators at the educational centres, according to the various educational levels/ages, different subjects and based on the established pedagogical approaches.

EVALUATION CRITERIA	MAIN FOCUS	CENTRAL THEME: SUSTAINABLE CONSUMPTION						
		ACTIVITY 1. Green school diagnosis on solid waste management			**ACTIVITY 2.** Actions to improve solid waste management at school level			**COMMENTS AND PROPOSALS**
		LEVELS			LEVELS			
		HIGH	MEDIUM	LOW	HIGH	MEDIUM	LOW	
KNOWLEDGE *Waste, solid waste, hazardous waste, integrated waste management, 5R principle.*	*Level of participatory process, motivation and commitment*							
PARTICIPATION, INTEREST *Involvement of teachers and students in the survey design and implementation.*	*Achievement of visible, concrete results*							
OUTPUTS OBTAINED *Survey design, Concrete survey results. Plan.*	*Achievement of visible, concrete results*							
FOLLOW-UP PROPOSALS *Implementation of the plan. Initiatives.*	*Presence of new ideas, projects and suggestions*							

ENERGY



ENERGY

Objectives

- Establish the fundamental elements related to energy in its connection with sustainable development processes.
- Propose actions to teach people about all these aspects and achieve greater awareness of the issues.

ENERGY

the inherent capacity of all physical systems to carry out movements and certain tasks, generating transformations or changes. In the field of technology and socio-economic requirements, energy refers to the use of specific natural or other resources to achieve social or industrial results.

RENEWABLE ENERGIES

Power generated by converting natural sources of energy, for example, solar energy (from the sun), hydro energy (from water), eolic energy (from the wind), tidal energy (from the movement of currents), geothermal energy (from the heat of the earth), bioenergy or biomass energy (related to the capitalisation of organic and industrial matter).

Basic concepts:

NON-RENEWABLE ENERGIES

diminish as they are consumed - reserves of these energies are limited. These include energy derived from oil, coal or natural gas, as well as nuclear energy. Currently, we are undertaking excessive extraction and use of non-renewable energies, which is not sustainable and generates socio-environmental impacts. Oil, coal and natural gas are known as fossil fuels, and contribute to our carbon footprint, polluting the atmosphere by generating greenhouse gas emissions.

NUCLEAR ENERGY

Energy that comes from nuclear reactions or the radioactive decay of unstable atoms. There are serious concerns about the use of nuclear energy, as its various phases produce significant levels of radioactivity, ionising radiation that can affect living beings.

According to 2021 statistics, **over 1 billion people globally live without electricity, and another 3 billion use polluting fuels such as wood or other biomass to cook or heat their homes.**[134] Renewable energy is increasingly important to allow countries to develop modern, secure and clean energy systems. The transition to green and clean energy also has enormous potential to foster economic development and increase GDP.[135]

According to UNEP,[136] and in the framework of the Sustainable Development Goals, particularly SDG 7 Affordable and Clean Energy, the number of people with access to electricity increased from 78% to 87%, and the number of people without energy fell to just under one billion between 2000 and 2016. The **energy sector is known to be a major contributor to climate change, accounting for around 60% of global greenhouse gas emissions.** To achieve SDG 7 by 2030, we need to invest in clean energy sources, such as solar, wind and thermal power, and to improve energy productivity. There is also a need to expand infrastructure and improve clean energy technology in all countries.

It is also crucial to stimulate energy savings, moving towards energy efficiency with more efficient production processes. We must try to reduce the amount of energy used and choose better technologies. For example, light-emitting diodes (LEDs) consume less energy than traditional light bulbs, as does the use of fluorescent lamps, or natural light. And, of course, we also need to act carefully and reduce unnecessary energy use in various social and economic activities.

[134] The World Bank. (2021). Energy. https://www.worldbank.org/en/topic/energy/overview
[135] UNEP. (2021). Accelerating the energy transition would benefit the environment and the economy in Panama https://www.unep.org/news-and-stories/press-release/accelerating-energy-transition-would-benefit-environment-and-economy
[136] United Nations Development Programme. (2021). Objective 7: Affordable and Clean Energy. https://www.undp.org/sustainable-development-goals#affordable-and-clean-energy

Our connections with energy

The human body requires energy for all its activities: for walking, moving, staying healthy and achieving a good balance (known as the “energy balance”). Food is the basic source of energy for all living beings, which is why care and a harmonious relationship with what we consume are essential to enhancing our natural connection with energy and to allow us to be always able to carry out all the necessary and daily actions of life itself. In this sense, organic, uncontaminated food can really become a good source of energy for everyone.

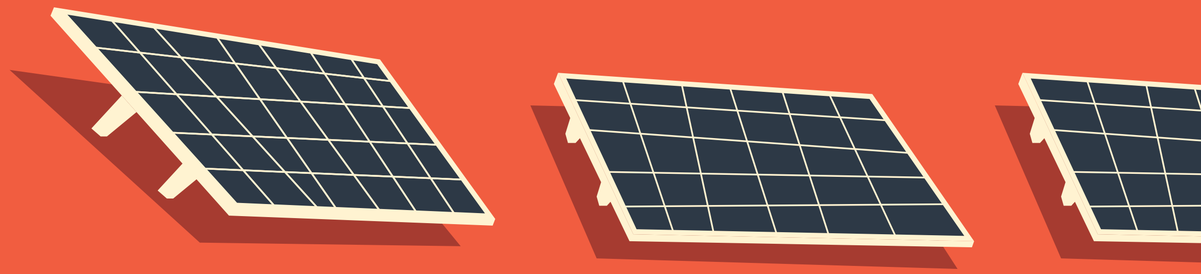
Social and economic relations with energy involve the use of various energy sources in order to obtain necessary resources, such as: lighting, home appliances (refrigerators, cookers, fans) and entertainment (radios, televisions, internet). Energy is also needed for industry to carry out all production processes. Access to energy transforms the lives of families in various areas including: education, access to information, mobility for greater connectivity, food, more efficient production systems, etc.

Energy can be seen through two lenses in the socio-economic fields: on the one hand, society, every individual, all social groups have to use energy properly to save energy and not waste it. On the other hand, industrial and extractive processes have to take the necessary measures to ensure that their actions do not pollute, affect water sources, forests, contaminate the air or lead to serious problems like climate change, soil deterioration, damage to biodiversity, noise generation and even the production of visual impacts, as in the case of some energy facilities. Similarly, **the state must play a fundamental role in creating the right conditions for a just and affordable energy transition.**

There are numerous cultural links to energy. Native or traditional communities perform various rituals to show their respect and gratitude for the sun, our energetic source of life, as well as to water, fire and the cosmos. The energy of Pachamama, of Mother Earth, is revered and cared for.

Cleansing and healing ceremonies are performed to allow people to balance their energies and recover their health. Sessions are held to articulate and share the energies of human groups, in a supportive and harmonious expression of solidarity. Support and accompaniment, for example, as part of the concept of Ayni used by Quechua and Aymara peoples, is expressed as a form of mutual aid, reciprocity and energy exchange.

Context in Latin America and the Caribbean:



A document by the Latin American Energy Organisation (OLADE)[137], entitled Energy Outlook of Latin America and the Caribbean 2018, **states that the region's energy sector is undergoing profound and continuous change, marked primarily by new technology trends in the sources and uses of energy.** One of these changes is the incorporation and gradual consolidation of non-conventional renewable energy sources into the regional energy matrix, with major advances in this direction occurring in some of the region's main economies.

The outlook found progress in electricity access: the number of people without access to electricity decreased from 20 million in 2016 to 19 million in 2017. It is worth nothing that natural gas rose from 29% of the primary energy matrix in 2012 to 34% in 2017. Energy security, which the International Energy Agency (IEA)[138] defines as: reliable, affordable access to all fuels and energy sources is an important issue.

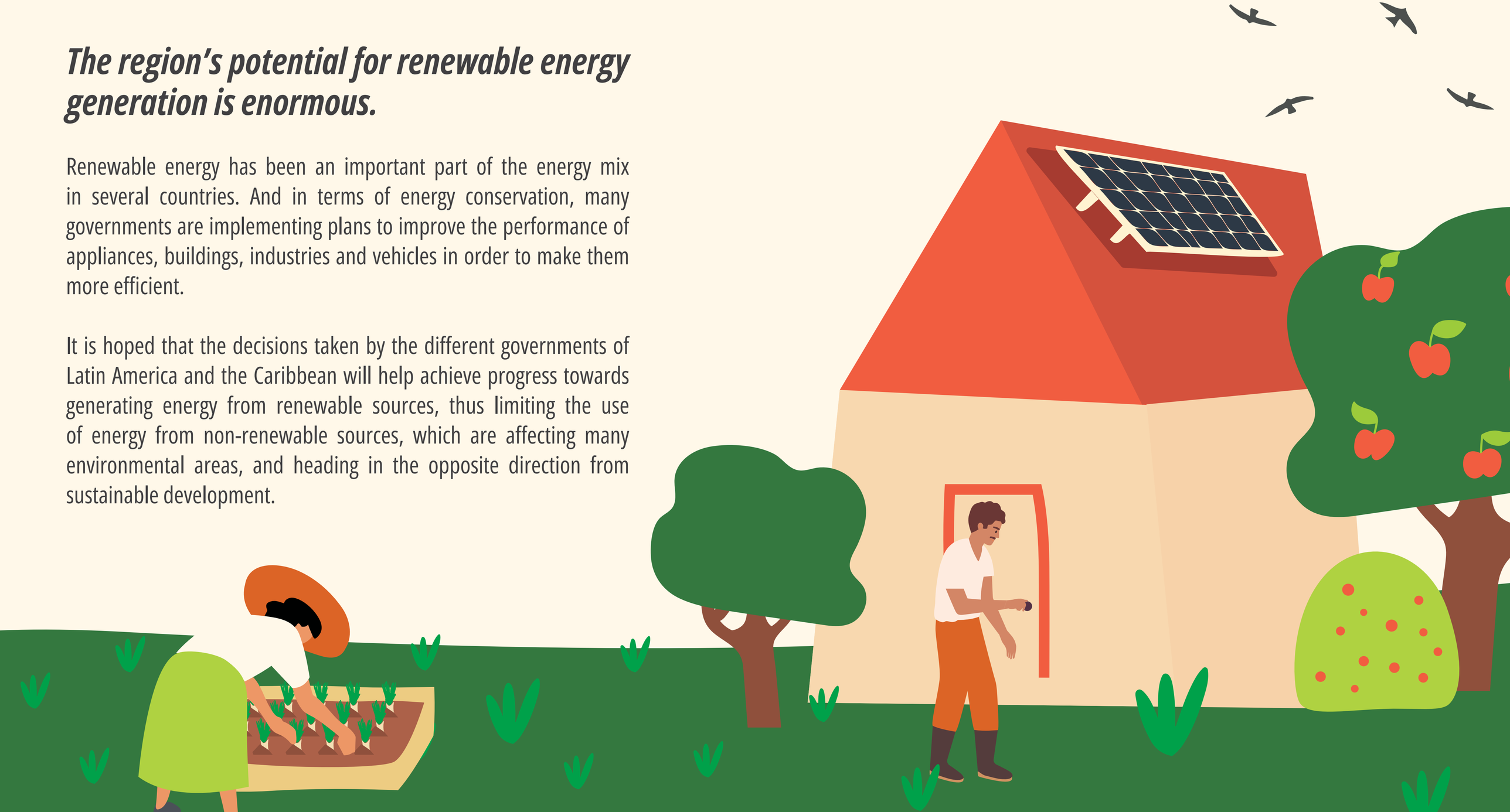
An OAS document entitled Seguridad Energética para el Desarrollo Sostenible en las Américas (Energy Security for Sustainable Development in the Americas)[139] notes that **the region requires an ever-increasing energy supply to sustain economic growth and development, and therefore energy resources are under great pressure.** Current patterns of energy generation and consumption pose a threat to the environment, particularly with regard to CO2 emissions, and they add that governments in the Americas are increasingly aware that energy paradigms need an overhaul to be able to respond adequately to the challenge of providing secure energy.

[137] Organización Latinoamericana de Energía - OLADE (Latin American Energy Organisation). (2018). Energy Outlook of Latin America and the Caribbean. https://biblioteca.olade.org/opac-tmpl/Documentos/old0424a.pdf
[138] International Energy Agency. (2021). Energy security - Topics. IEA. https://www.iea.org/topics/energy-security
[139] Organization of American States. (2018). (Seguridad Energética para el Desarrollo Sostenible en las Américas) Energy Security for Sustainable Development in the Americas. https://www.oas.org/dsd/publications/Documents/EnergySecurity_SPA.pdf

The region's potential for renewable energy generation is enormous.

Renewable energy has been an important part of the energy mix in several countries. And in terms of energy conservation, many governments are implementing plans to improve the performance of appliances, buildings, industries and vehicles in order to make them more efficient.

It is hoped that the decisions taken by the different governments of Latin America and the Caribbean will help achieve progress towards generating energy from renewable sources, thus limiting the use of energy from non-renewable sources, which are affecting many environmental areas, and heading in the opposite direction from sustainable development.



Thematic contributions

Mathematics:

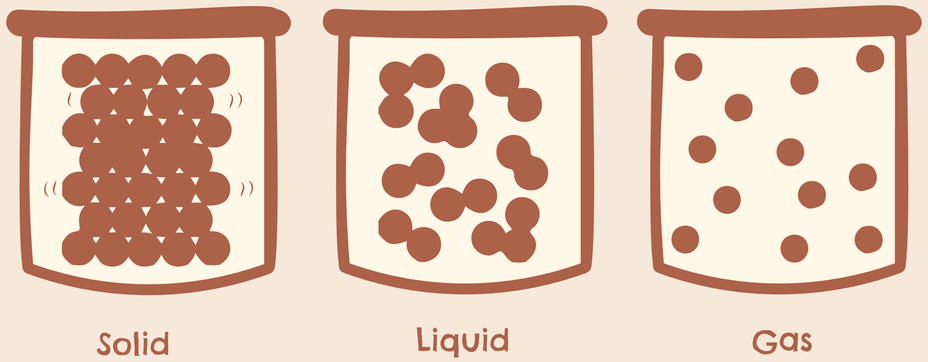
- Establish the main parameters involved in calculating energy consumption in an average household, regarding the use of a few common appliances.

- **Propose an analysis of ways to make energy savings that can be carried out in each household, and calculate the financial savings that the reduced energy consumption would entail based on the basic official cost of electricity.**

Natural Sciences:

- Start from the subject of matter as related to volume and mass; and its solid, gaseous and liquid states; or to relate matter to energy and energy sources, by explaining how these make matter move or change.

- **Explain the differences between energy types: renewable or non-renewable, their current use and the most important consequences to consider.**



Example

Language and Literature:

- Invite the group to write and discuss a story about our use of energy from non-renewable sources, which will one day run out, and that are currently polluting our environment.

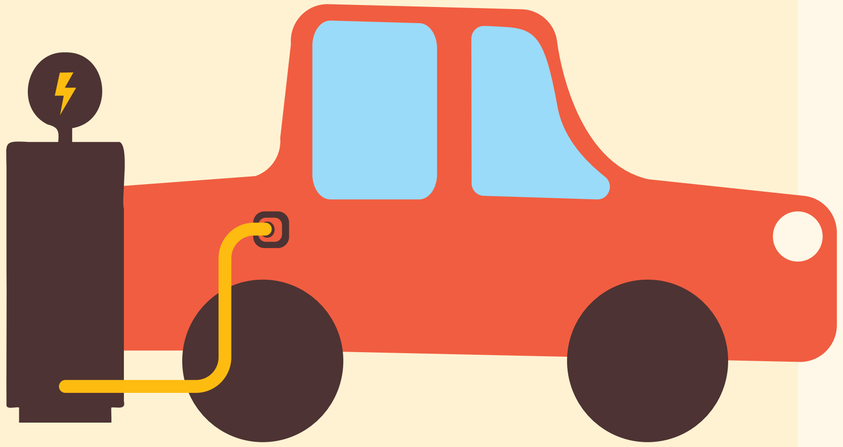
- **Define and highlight some of the main contemporary expressions related to energy, such as: energy security, energy efficiency, unsustainable consumption, etc.**

Example

Social Sciences:

- Identify historical processes of social and economic change in relation to energy use and how this relates to climate change. Emphasise the importance of social responsibility for good energy use.

- **Analyse the main approaches involved in our need to use non-renewable energies that progress towards sustainable development.**



Example

The Arts:

- Invite students to make drawings or posters illustrating the main renewable energies (solar, wind), as a way of presenting them in an artistic way to interest people.

- Produce a model or drawing of a sustainable city that includes energy principles.

- **As a group, produce cartoons to show the ways and importance of saving energy in a funny and attractive way.**

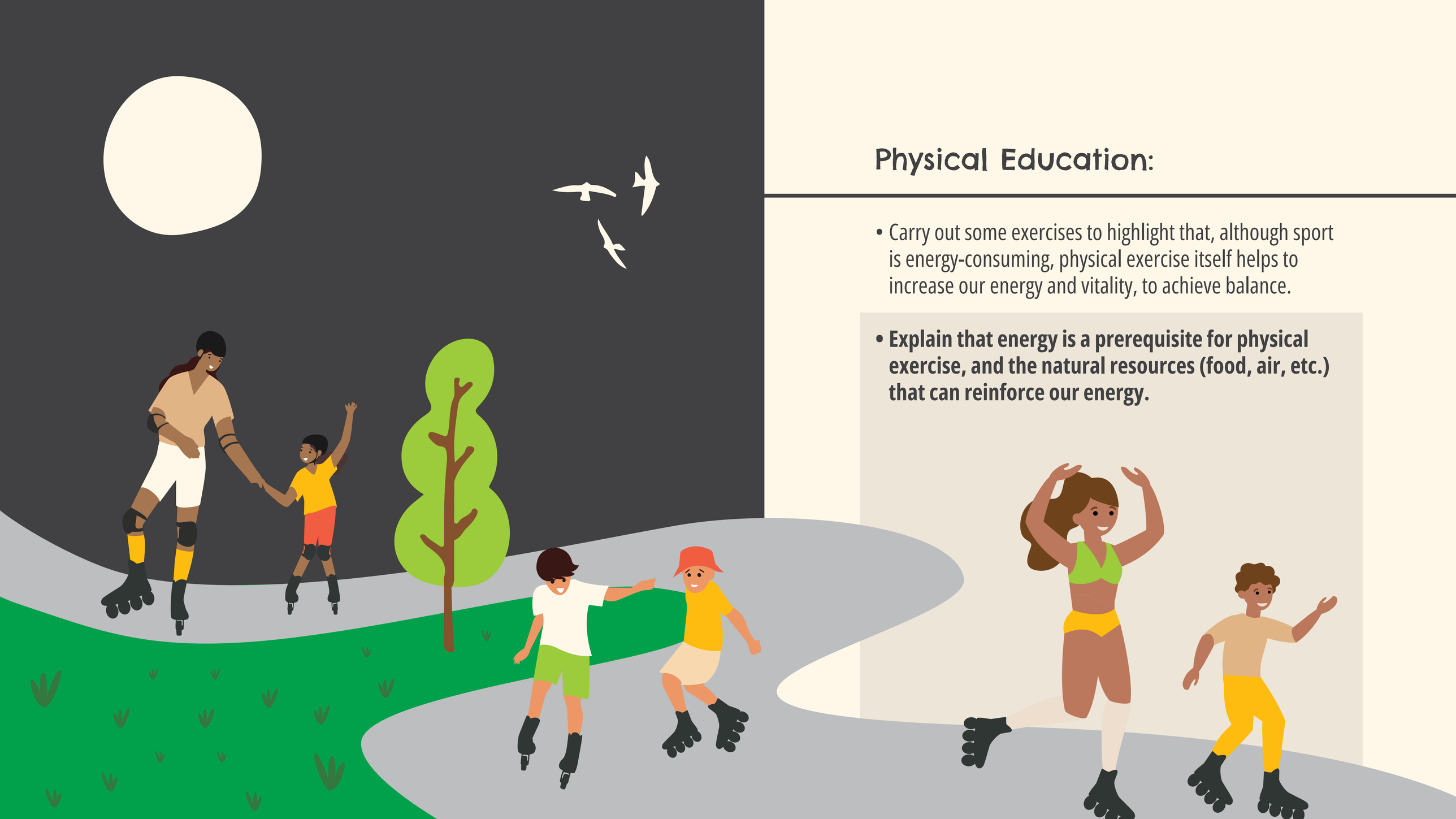
  Por ejemplo: For example: boys and girls turning off lights, cycling, changing light bulbs for LEDs, unplugging equipment, etc.

Example

Physical Education:

- Carry out some exercises to highlight that, although sport is energy-consuming, physical exercise itself helps to increase our energy and vitality, to achieve balance.

- **Explain that energy is a prerequisite for physical exercise, and the natural resources (food, air, etc.) that can reinforce our energy.**

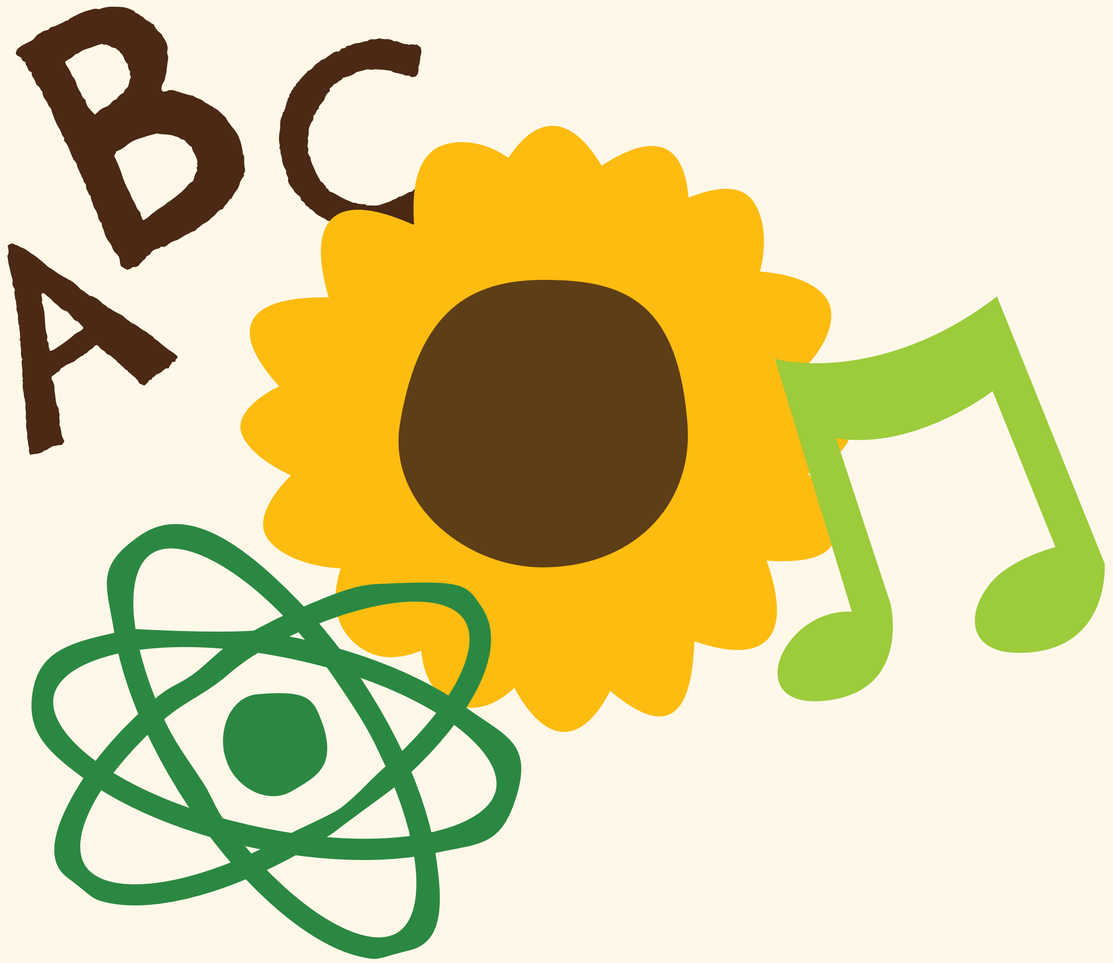


Potential interdisciplinary activities

Once teachers have made their subject contributions for classroom use, the Interdisciplinary Committee meets to design and agree on a common Desirable Scenario. For example:

"Students are actively involved in the design and development of a travelling exhibition to raise local community awareness of the importance of energy and energy saving."

Once some of the details, approaches and scopes of the Scenario have been drafted and specified, organise interdisciplinary activities to celebrate and educate people in this subject at the educational centre and/or with the community.



"THE SUNFLOWER" TRAVELLING EXHIBITION ON ENERGY

1. Example of an interdisciplinary activity on energy

Main theme and focus: Preparation of a series of thematic panels by the students, with the help of teachers and possibly volunteers, parents, to express the importance of energy and saving energy, and to create a travelling exhibition to raise awareness in the community surrounding the school.

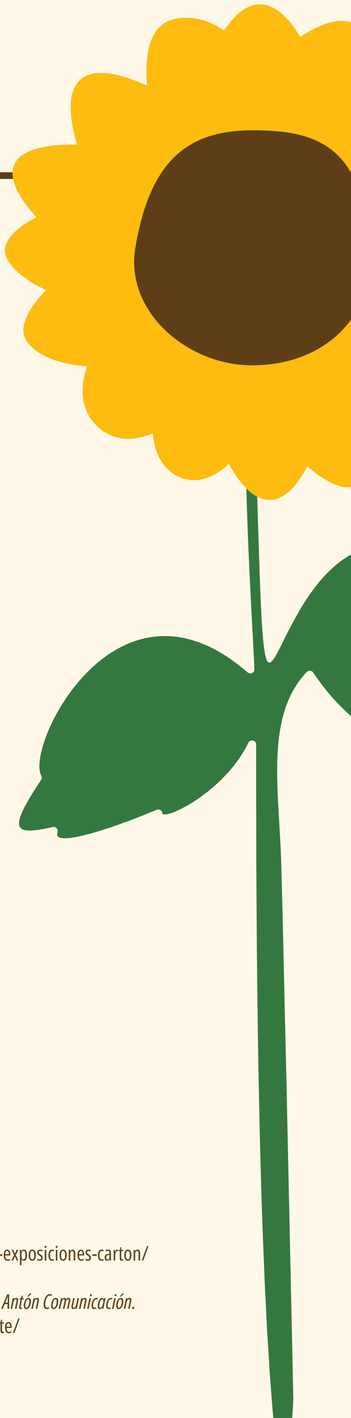
What is a travelling exhibition? A thematic exhibition that can be presented and moved to different spaces (public squares, cultural centres, etc). Therefore, it should be easily adaptable, easily transportable and able to be placed in different locations. This is achieved using folding or free-standing panels.

The focus will be on the students' contribution to the wider community, expanding their knowledge and understanding of the main issues in this field. The travelling exhibition could be called Sunflower, as this plant symbolises energy and the sun, both because it follows the sun and because of its many uses. It has now become a symbol of energy and solar panels.

Preparatory activities

The advantages and possible results of this exhibition are analysed in previous meetings involving the teachers and educational centre management. These sessions are complemented with a few conversations with the local authorities, people linked to community and neighbourhood organisations, non-governmental organisations, companies, etc. All this is to raise the idea of the exhibition and gain support for its implementation and subsequent presentations in public places. All consultations emphasise that the exhibition is a student and school contribution to the general public's awareness of energy issues.

The type of panels to be constructed and the materials that can be used and are readily available will be defined on this basis. There are many interesting experiences and models, especially with cardboard. Other materials such as cork, newspaper, wooden frames, etc. can also be used.



[144] Ver por ejemplo, estos 3 modelos y propuestas:
CartonLab. (2021). *Consejos para diseñar una exposición con soportes de cartón*. https://cartonlab.com/blog/diseno-de-exposiciones-carton/
Rubio, S. M. (2013). *Exposiciones de cartón. Museo, Go Green!* https://museogogreen.com/2013/01/17/325/
Grupo Antón Comunicación. (2015). *El cartón que envuelve nuestras ilusiones, el cartón de MADE IN ALICANTE - Blog Grupo Antón Comunicación.* https://www.grupoanton.es/ntn/2015/12/10/el-carton-que-envuelve-nuestras-ilusiones-el-carton-de-made-alicante/

2. Contents of the main exhibition panels:

The following are a few suggestions for the content of the main panels, starting from a common style: Each topic should be accompanied by drawings, photos or suggestive and explanatory images, and should also include a brief explanation of the topic, with lettering and wording that makes it easy to read and understand for different types of people. You don't need to include panels explaining every kind of energy, focus on the ones that are more relevant and easier to understand for the target audience.

Panel 1. *What is energy?* Types of renewable and non-renewable energy: A short introductory sentence defining the energy, its symbolic relationship with the Sunflower, and a list of the main types of energy, with a call for interest and participation.

Panel 2. *Electricity:* how it is generated in the country, and locally, its importance.

Panel 3. *How can we save energy?* List of the main actions to save energy in homes, offices, premises, etc. For example:

- *Take advantage of natural light by opening windows as much as possible*
- *Turn electrical appliances off when not in use*
- *Turn lights off when you leave the room*
- *Use energy-saving light bulbs (LED, fluorescent and others)*
- *Only open the refrigerator or cooler only when necessary, and close it quickly.*
- *Only iron essential garments*
- *If you need fans or heaters, use them sparingly and turn them off when the temperature improves.*

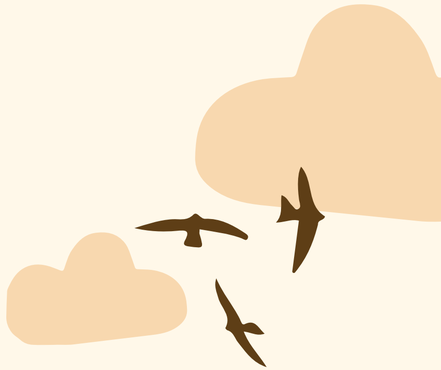
Panel 4. *Wind energy:* Source and use of winds, connection with windmills. Advantages: renewable, non-depleting, clean, no impact on the soil. Difficulties: local wind variations, can affect the natural landscape, sometimes produce noise.

Panel 5. *Hydropower: I*ts use in dams, rivers, etc. Advantages: low costs, various applications in industry, low CO2 emissions. Disadvantages: impact on local fauna and flora, terrestrial flooding, impact on rivers and wetlands.

Panel 6. *Solar energy, solar panels:* This form of energy comes from the sun in the form of light, heat and ultraviolet rays. Advantages: the sun does not run out, panels do not pollute and are easy to install in places that are difficult to access, in homes or elsewhere. Disadvantages: there can be changes in the sun's radiation and panels depend on rhythm of day/night, as well as the angle at which the sun is received.

Panel 7. *Biomass energy:* Obtained from organic compounds. Advantages: obtaining them is a natural process, waste can be eliminated and put to a new, non-polluting use. Disadvantages: toxic gases can sometimes be produced during combustion if not carried out properly.

Panel 8. *Conclusions:* Thank exhibition participants and visitors for their interest in energy, and include phrases to encourage everyone to continue caring for and saving energy, with their non-polluting and renewable approaches. A notebook for comments and suggestions is placed nearby. You could promote the idea of putting on a play or travelling event to explain energy dynamics and types.



3. Presentation and tour of the exhibition.
The first presentation takes place at the school. Comments and suggestions about the details and possibilities for future tours are invited. This presentation is attended by participating students, who will act as exhibition guides.

This “première”, and any relevant adjustments launch the tour, which is based on the agreements reached with the authorities, community leaders, young people or those responsible for companies or businesses. This tour could comprise three or four presentations in different locations, depending on the surrounding areas: urban or rural, etc.

4. Final report.
Once the planned tour has been completed, keep the panels for future use or other environmental dissemination purposes. Carry out an initial assessment of the results and thank the students, teachers and other participants for their work.

FOLLOW-UP TO THE EXPERIENCES RELATED TO THE TRAVELLING EXHIBITION

2. Example of an interdisciplinary activity on energy

Main theme, approach and guidelines: The main themes to be studied further at the educational centre are established on the basis of the experience obtained through the travelling exhibition, and in accordance with the suggestions made by the organisers and visitors.

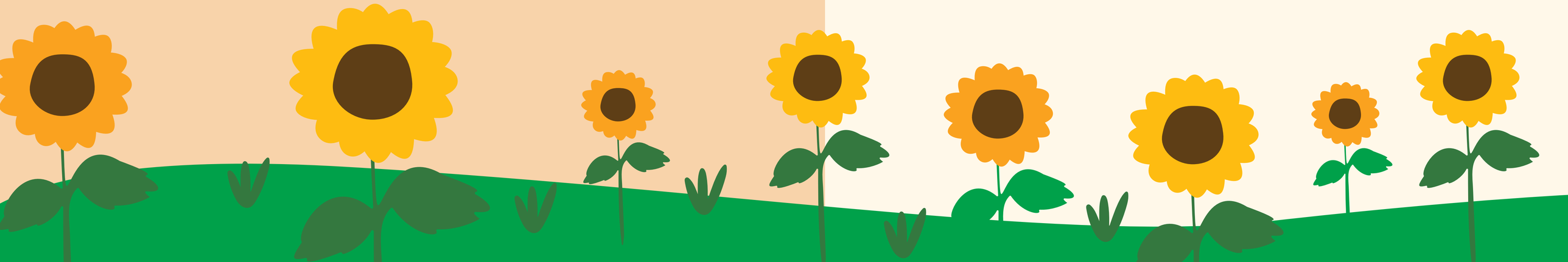
It will be interesting to follow up creatively with input from a variety of people. This monitoring can reflect and take action.

For example:

- The participants identify a need to learn more about some aspects of renewable energies, in which case workshops could be organised to address their main terms.

- There is interest in carrying out a green school diagnosis on the appropriate use of energy (see the example of the green school diagnosis on solid waste). Recommend putting up signs to remind people to turn off all computers and lights when leaving a room.

- A specific idea for a targeted media campaign is raised, in which case the issues that attracted most public attention would be addressed. These and other creative follow-up actions are important, as it is essential that pupils understand that every action taken must be analysed and followed up to ensure sustainable environmental education.



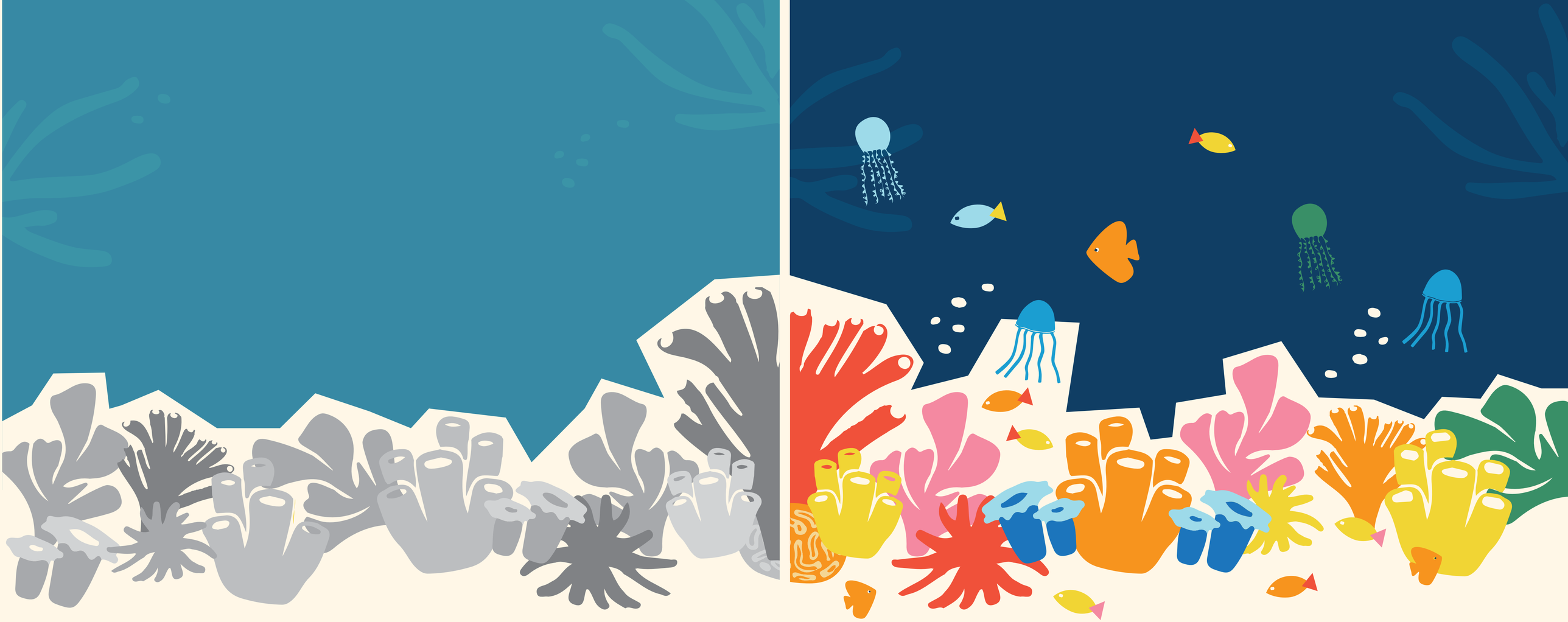
Evaluation of the activities carried out

The Desirable Scenario designed in the Interdisciplinary Roundtable is taken as the main reference for evaluating the activities carried out. In the case of energy, this was: "Students are actively involved in the design and development of a travelling exhibition to raise local community awareness of the importance of energy and energy saving." For evaluation purposes, two main objectives can therefore be considered to have been pursued:

- *Raise community awareness on energy issues and energy saving.*
- *Provide elements for monitoring this process.*

Four general criteria could be used to evaluate the activities carried out. These can be developed into specific indicators at the educational centres, according to the various educational levels/ages, different subjects and based on the established pedagogical approaches.

EVALUATION CRITERIA	MAIN FOCUS	CENTRAL THEME: ENERGY						
		ACTIVITY 1. Travelling exhibition on energy			ACTIVITY 2. Follow-up to lessons learned			COMMENTS AND PROPOSALS
		LEVELS			LEVELS			
		HIGH	MEDIUM	LOW	HIGH	MEDIUM	LOW	
KNOWLEDGE *Energy, renewable energy, non-renewable energy, nuclear energy.*	*Extent to which understanding of key issues has been achieved*							
PARTICIPATION, INTEREST *Participation in the design of the panels, their preparation and presentation. Public interest.*	*Level of participatory process, motivation and commitment*							
OUTPUTS OBTAINED *Exhibition designed, produced and presented. Eight Panels*	*Achievement of visible, concrete results*							
FOLLOW-UP PROPOSALS *Proposals for further use and new exhibition spaces*	*Presence of new ideas, projects and suggestions*							

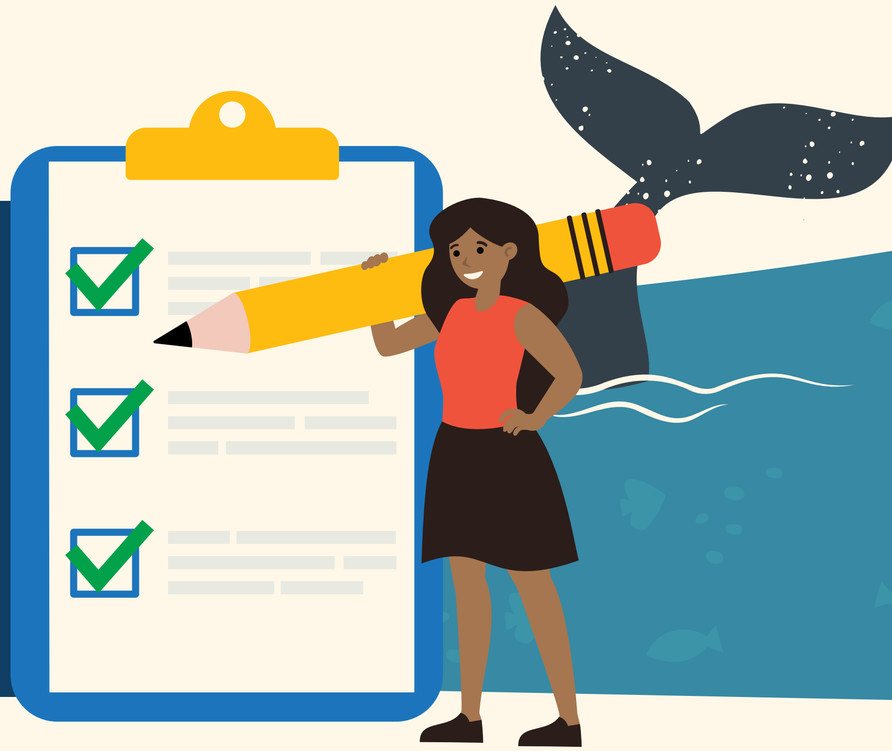


ECOSYSTEM RESTORATION

ECOSYSTEM RESTORATION

Objectives

- Raise awareness of the main aspects of ecosystem restoration so thatthis process is understood and valued.
- Provide information about the UN Decade on Ecosystem Restoration 2021-2030, in order to incentivise active engagement with the core targets.
- Share disciplinary contributions and interdisciplinary visions on ecosystem restoration, as part of a participatory approach for local, regional and international sustainable development, with emphasis on Latin America and the Caribbean.



ECOSYSTEM RESTORATION

Ecosystem restoration is defined as a process of reversing the degradation of ecosystems (such as landscapes, lakes and oceans) to restore their ecological functions, and conserve those still intact. Healthier ecosystems improve productivity and ecosystems' capacity to meet society's needs[1] through the protection and enhancement of livelihoods, more fertile soils, more resources and greater greenhouse gas reserves. They also reduce the risk of natural disasters and control diseases.

ECOSYSTEM

A dynamic complex of plant, animal and microorganism communities and their abiotic environment interacting as a functional unit. A functional unit consisting of all the living organisms (plants, animals, microbes) in a given area, and all the non-living physical and chemical factors of their environment, linked together through nutrient cycling and energy flow.[2]

[1] UN Environment. (2019) New UN Decade on Ecosystem Restoration offers unparalleled opportunity for job creation, food security and addressing climate change. Environment https://www.unep.org/news-and-stories/press-release/new-un-decade-ecosystem-restoration-offers-unparalleled-opportunity

[2] Glossary of terms. (n/d). www.fao.org Retrieved 14 April 2022, from https://www.fao.org/3/i2080e/I2080E.pdf

Basic Concepts:

ECOSYSTEM ECOLOGY

Integrated study of the ecosystem components of living (biotic) and non-living (abiotic) beings and their interactions within the framework of an ecosystem. It examines how these systems function and how their components (chemicals, bedrock, soils, plants and animals) relate to each other.

DEGRADATION OF ECOSYSTEMS

Process of deterioration or damage that leads to the depletion of natural resources due to overexploitation and mismanagement by humans, resulting in serious damage to ecosystems.[3]

ECOSYSTEM SERVICES

Ecosystem services are the multitude of benefits that nature provides to society.[4] They improve people's health, economy and quality of life. Ecosystem services make human life possible by, for example, providing nutritious food and clean water, regulating disease and climate, supporting the pollination of crops and soil formation, and providing recreational, cultural and spiritual benefits. There are four types of services: provisioning, regulating, supporting and cultural. These are the material benefits that people obtain from ecosystems such as water, food, medicines and raw materials.

ECOSYSTEMS' CARRYING CAPACITY

The maximum growth limit of a biological population the environment can support without negative effects on the population or the environment in a given period of time. This maximum number of the individuals in a population that the environment can support depends on the resources available, such as water, food and space.

INDIGENOUS AND INTRODUCED SPECIES

Indigenous species are fauna and flora that are native to the geographic location where they are found, without prior human intervention. Introduced species are those that have been added into a natural ecosystem by human intervention.

MAIN TYPES OF ECOSYSTEMS

Marine ecosystems. The oceans and seas. Marine biodiversity, life in the oceans and seas, is a fundamental aspect of sustainable development. **The oceans are one of the world's major biodiversity reserves. They constitute over 90% of the planet's habitable space and contain some 250,000 known species, with many more yet to be discovered.[5]**

[3] Portillo, SR. (2020). DEGRADACIÓN AMBIENTAL: qué es, causas, consecuencias y ejemplos - Resumen (ENVIRONMENTAL DEGRADATION: definition, causes, consequences and examples - Summary). www.ecologiaverde.com. https://www.ecologiaverde.com/degradacion-ambiental-que-es-causas-consecuencias-y-ejemplos-3105.html

[4] Ecosystem services and biodiversity. (sn/d-a). Food and Agriculture Organisation of the United Nations. Retrieved 14 April 2022, from https://www.fao.org/ecosystem-services-biodiversity/en/

[5] Paşca-Palmer, C. (n/d-b). Marine Biodiversity and Ecosystems Underpin a Healthy Planet and Social Well-Being. United Nations. Retrieved 15 April 2022, from https://www.un.org/en/chronicle/article/marine-biodiversity-and-ecosystems-underpin-healthy-planet-and-social-well-being

Basic Concepts:

Coastal ecosystems. The unique habitats formed by plants and other organisms that can thrive at the borders between ocean and land, where they must live in saltwater and changing tides.[6]

Freshwater ecosystems. There are different types of freshwater ecosystems: Lakes and ponds, where water moves very slowly; and rivers, where water flows quickly under the influence of gravity and the topography. Finally, wetlands are areas that remain flooded or where the soil is saturated by water for considerable periods of time.

Desert ecosystems. Deserts are places with very infrequent rainfall. There is little diversity in desert fauna and flora, as few forms of life can survive in such difficult conditions, and alterations in one species have severe knock-on effects.

Mountain ecosystems. Mountain ecosystems are shaped by altitude, slope, temperature changes and climatic diversity. The slope is the characteristic incline of mountainous terrain.

Mountain ecosystems comprise a set of factors such as soil, water or climate and the living organisms that inhabit them.

Forest ecosystems. Ecosystems with a high density of trees or flora in general. Forest ecosystems can be divided into the following sub-categories: jungle, dry forest, temperate forest, taiga and tundra (the latter two have low temperatures and scarce water). The diversity of animal species is usually very high where many trees grow close together, as this provides many ecological niches that can be covered by different life forms. A range of tree species allows for different food sources, different types of shelter, different ways of moving on the ground or branches, etc.

Artificial ecosystems. An artificial ecosystem is one in which human activity has created places that are very different from those that existed until a few millennia ago. They are characterised by the presence of buildings, urban industries and large areas of lighting, concrete and pavement. Some species have adapted to urban environments, for example, pigeons, and also cats.

[6] MIT. (2021). Coastal Ecosystems and Climate Change. MIT Climate Portal. Retrieved 28 July 2022, from https://climate.mit.edu/explainers/coastal-ecosystems-and-climate-change

Our con with Ecosystem Restoration

Ecosystem condition directly influences the health of all people; healthy ecosystems provide a range of collective benefits. On the other hand, if ecosystems suffer serious loss, resource depletion, water or air pollution, this will have negative social, economic and cultural repercussions.

On a social and cultural level, when nature is devastated, for example by the disappearance of animal species, the loss of native trees or the desertification of soils, human groups feel the loss of well-known and well-loved places, as well as of natural areas that were part of their routines or walks, and of activities that were very important. This feeling of loss is greater among rural populations, who care for, cultivate, enjoy and obtain the benefits of ecosystems, and whose livelihood is affected and income diminished when these deteriorate.

Urban populations connect to natural ecosystems through the parks, lakes or mountain areas provided and cared for in their areas. These places are often subjected to negative actions, such as solid waste management or green space neglect, affecting biodiversity and air and water quality. Industry, transport pollution and careless activities can also cause serious problems.

For these reasons, some of the affected groups are beginning to promote a range of recovery actions designed to return such places to equilibrium. From a cultural point of view, it is well known that **indigenous communities have been carrying out actions to restore the ecosystems in which they live and survive for many years. Many community activities have positive ecosystem restoration results, in farming or fishing areas, for example.**

Everyone enjoys the inner or individual well-being felt in undegraded ecosystems – areas that maintain their diversity, balance and harmony, where life is breathed and perceived at its best.

These positive feelings can therefore be used as the basis for a range of actions and processes to restore ecosystem balance, so that we can again enjoy the benefits of being part of nature. As part of an Action Plan, these activities can take place at the personal level, in groups, and with private or public organisations, so that the importance of restoring ecosystems can be conveyed at various levels.

Ecological or ecosystem restoration serves to maintain properly functioning ecosystems, biodiversity conservation and sustainable ecosystem management. It also improves physical, socio-economic and cultural aspects and prevents the adverse effects of climate factors, such as erosion and flooding, while also ensuring the stability of soils as substrates and maintaining hydrological systems. Finally, restoration gives rise to socio-economic benefits such as water sources, slope stabilisation (which prevents landslides), soil recovery for agriculture, pollination for crops, etc.[7]

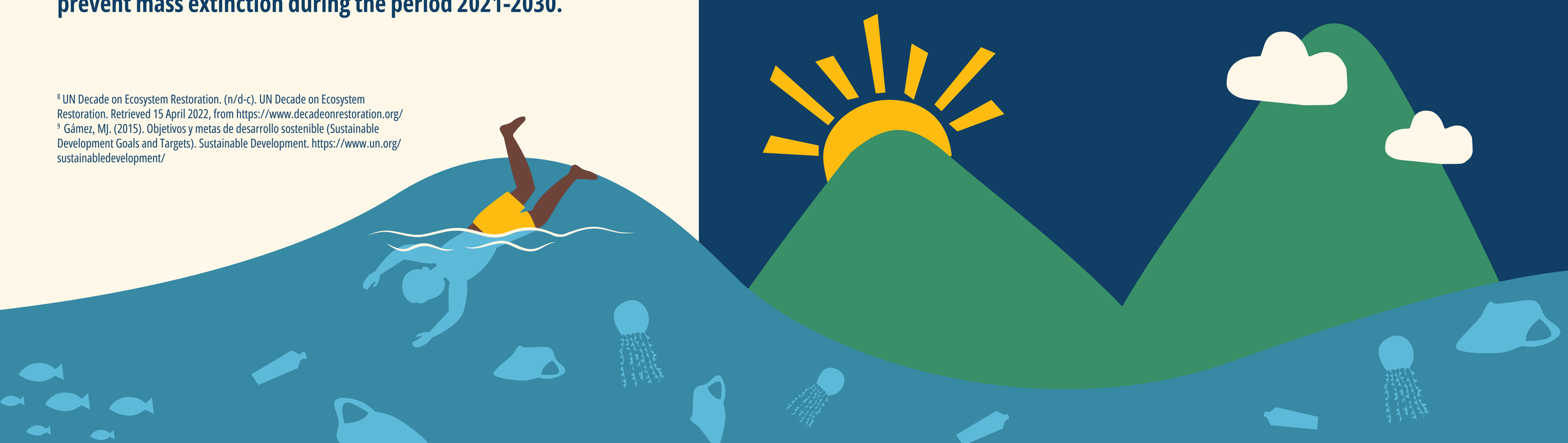
[7] Roldán, LF. (2020). RESTAURACIÓN ECOLÓGICA: Qué es, Tipos y Ejemplos (ECOLOGICAL RESTORATION: Definition, Types and Examples). www.ecologiaverde.com. https://www.ecologiaverde.com/restauracion-ecologica-que-es-tipos-y-ejemplos-2636.html

There are four main types of ecological restoration. The first is **remediation**, which enables the clean-up of polluted ecosystems. **Reclamation** gives the ecosystem a new use for a concrete, socially and environmentally acceptable activity. **Reforestation** re-establishes forests or other vegetation after they have been cleared, and **facilitation** promotes the development of other species.

The United Nations Decade on Ecosystem Restoration 2021-2030[8] is a plan agreed by countries belonging to the United Nations Assembly General that aims to prevent, halt and reverse ecosystem degradation on all continents and oceans, thus helping to eradicate poverty, combat climate change and prevent mass extinction during the period 2021-2030.

This decision was based on the recognition that none of the 17 Sustainable Development Goals (SDGs) can be achieved unless a significant effort is made to restore ecosystems. Restoration through agroforestry has the potential to increase food security for 1.3 billion people globally. Mangrove restoration contributes significantly to carbon sequestration, climate change and storm protection. It is important to note that ecosystem restoration can contribute to achieving most of the Sustainable Development Goals (SDGs). In particular, restoration relates directly to SDG 13: Climate Action, SDG 6: Clean Water and Sanitation, SDG 15: Life on Land, and SDG 14: Life Below Water.[9]

[8] UN Decade on Ecosystem Restoration. (n/d-c). UN Decade on Ecosystem Restoration. Retrieved 15 April 2022, from https://www.decadeonrestoration.org/
[9] Gámez, MJ. (2015). Objetivos y metas de desarrollo sostenible (Sustainable Development Goals and Targets). Sustainable Development. https://www.un.org/sustainabledevelopment/



Context in Latin America and the Caribbean

Latin America and the Caribbean is particularly rich in terms of biodiversity,[10] being home to seven of the world's most biodiverse countries. But although 24.2% of its land and 17.5% of its marine areas are protected, many ecosystems have been significantly degraded, threatening people's well-being, countries' potential to adapt to climate change and, ultimately, the viability of a sustainable future.

It is worth highlighting some restoration initiatives[11] in several countries. For example in Ecuador, in the Galapagos Islands, invasive plant species are being replaced by local crops; in Peru, an ecosystem restoration programme is being implemented in the Imiría Regional Conservation Area in Ucayali; in Bolivia, experiences aim to organise organic family gardens by rescuing ancestral knowledge; and in Colombia, programmes to restore dry forests and wetlands are being developed.

In Mexico, a socio-ecological tree species importance index[12] has been developed for use in productive restoration in rural communities in the State of Oaxaca. In Panama, producer groups realised that livestock farming can be more productive and sustainable if better animal management practices are combined with silvopasture systems, in which fodder trees and shrubs are combined with livestock production.

In arid areas of Patagonia, Argentina, ecological restoration based on environmental education invites people to learn about ecological concepts and research nature and cultural history. Active participation in all levels of restoration projects aims to foster a sense of belonging, competence and community connection.

It is important to note that **several countries in Latin America and the Caribbean have promoted national ecosystem restoration plans (or programmes) in recent decades.**

[10] América Latina se une para restaurar los ecosistemas y evitar pandemias en la región (Latin America unites to restore ecosystems and prevent pandemics in the region). (2021). UN News. https://news.un.org/es/story/2021/02/1487502

[11] Sierra, Y. (2021). ¿Es posible restaurar los ecosistemas de Latinoamérica? (Can Latin America's Ecosystems be Restored?) Mongabay environmental news https://es.mongabay.com/2021/06/dia-mundial-medio-ambiente-restauracion-ecosistemas-latinoamerica/

[12] Ceccon, E., & Pérez, D. (Eds.). (2016). Más allá de la ecología de la restauración: Perspectivas sociales de América Latina y Caribe (Beyond Restoration Ecology: Social Perspectives in Latin America and the Caribbean). https://elti.yale.edu/sites/default/files/rsource_files/libro_final_7-11_perspectivas_sociales_re.pdf

These include Brazil's PACTO (Pact to Restore the Atlantic Forest);[13] Colombia's PNR (National Plan for Ecological Restoration, Rehabilitation and Recovery of Degraded Areas);[14] Guatemala's MNRF (National Forest Landscape Restoration Board);[15] El Salvador's PREP (National Ecosystem and Landscape Restoration Programme);[16] Chile's National Plan for Restoration of Landscapes;[17] Argentina's National Native Forest Restoration Plan (PNRBN)[18]; and others.

The **Action Plan for the Decade on Ecosystem Restoration in Latin America and the Caribbean**[19] is a voluntary, regional-level effort focused on cooperative mechanisms, showing the region's understanding of the need to make progress on this front and the importance of recovering the region's natural capital. It is also the result of several decades' work on ecosystem restoration both in terms of developing and strengthening the institutional and legislative infrastructure to promote and regulate activities, and in terms of the technical capacity to implement solutions on the ground.

Latin America and the Caribbean are experiencing significant ecosystem degradation and loss. A major effort is required to halt degradation and ensure that healthy ecosystems underpin sustainable development throughout the region. By 2030, Latin America and the Caribbean aim to have made significant progress in defining policies and plans and implementing projects in the restoration of marine, terrestrial and inland water ecosystems at a relevant spatial scale, in order to reverse the adverse effects of degradation. Consequently, ecosystems and natural habitats across the region are now being restored, protected and sustainably managed.

[13] Pacto pela Restauração da Mata Atlântica (Pact to Restore the Atlantic Forest). (2021). Pacto pela Restauração da Mata Atlântica (Pact to Restore the Atlantic Forest). https://www.pactomataatlantica.org.br/
[14] Super User. (n/d-g). Plan Nacional de Restauración Ecológica, Rehabilitación y Recuperación de Áreas Degradadas - PNR (National Plan for Ecological Restoration, Rehabilitation and Recovery of Degraded Areas). Gov.co. Retrieved 15 April 2022, from https://archivo.minambiente.gov.co/index.php/bosques-biodiversidad-y-servicios-ecosistematics/management-in-biodiversity/ecological-restoration
[15] Mesa de Restauración del Paisaje Forestal de Guatemala (Guatemala Forest Landscape Restoration Office). (2015). Estrategia de Restauración del Paisaje Forestal: Mecanismo para el Desarrollo Rural Sostenible de Guatemala (Forest Landscape Restoration Strategy: Mechanism for Sustainable Rural Development of Guatemala) www.fao.org. Retrieved 15 April 2022, from https://www.fao.org/forestry/43244-0d7675c1321e62fbaa45f9e3d339c77c8.pdf
[16] Barry, D., & Environment and Natural Resources, M. (2012). Programa Nacional de Restauración de Ecosistemas y Paisajes - PREP (National Programme for Ecosystem and Landscape Restoration). http://rcc.marn.gob.sv/handle/123456789/42?show=full
[17] (n/d-h). Gob.cl. Retrieved 15 April 2022, from https://consultasciudadanas.mma.gob.cl/storage/consulta/antecedentes/b6d654bb-2ed2-42a6-aac6- dc6ab3a31b25.pdf
[18] Government of Argentina. (2018). Plan Nacional de Restauración de Bosques Nativos - PNRBN (National Plan for the Restoration of Native Forests). https://www.fao.org/faolex/results/details/es/c/LEX-FAOC196664/
[19] Environment, UN (2021). Action Plan for the Decade on Ecosystem Restoration in Latin America and the Caribbean. UNEP - United Nations Environment Programme. https://www.unep.org/resources/policy-and-strategy/action-plan-decade-ecosystem-restoration-latin-america-and-caribbean

Thematic contributions

Mathematics:

- Calculate the current proportion and differences, and their potential impact on the ecosystem and restoration required.

- **Estimate the number of native tree species found in the area where the school is located (in an urban park or natural space). Compare the results with the number of non-native or introduced species in the same area.**

Natural Sciences:

- Analyse local and regional ecosystem degradation, and the need for restoration actions, based on knowledge of these ecosystems' former condition.

- **Survey what the students think about ways to restore the ecosystems in the region, from a natural science perspective.**

Language and Literature:

- Find local or regional poetry about nature and its appreciation or degradation, in order to encourage joint reading and reflection on the importance of promoting restoration through the awareness such readings can raise.

- **Promote the reading of Latin American, regional or local writing on nature, and its conservation or depredation. Encourage students to read and then write about texts related to their environment that talk about its potential loss and/or restoration.[20]**

[20] See for example Medero, SL. (2020). El ambiente en tus manos: antología literaria infantojuvenil (The Environment in your Hands: A literary anthology for children and young people). Ediciones INTA. https://bit.ly/2XgsQQL

Example

Social Sciences:

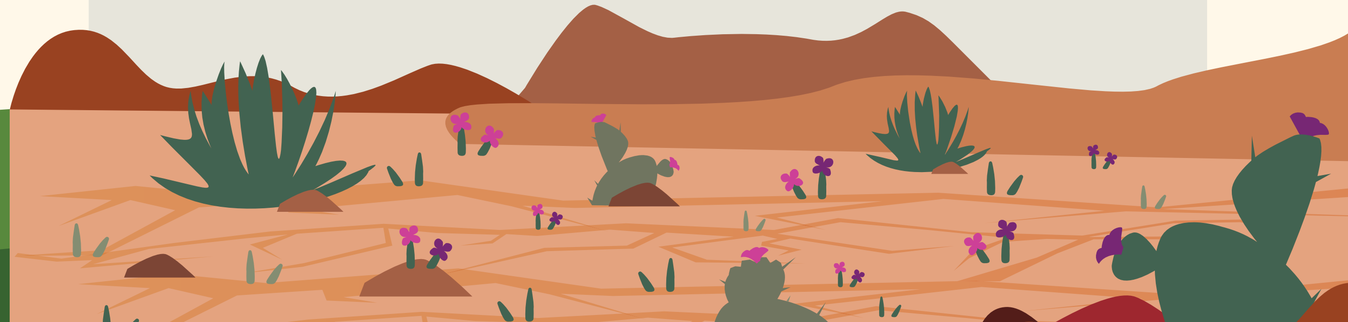
- Encourage students to contact urban or rural groups of people, neighbours and communities to learn local knowledge about ecosystems and their current situation or degradation. Emphasise the knowledge of local seeds and produce, and the connection with community food and economies.

- **Analyse our collective social and cultural responsibility to improve the current conditions of the ecosystems in the area (this affects everyone: from the various local and regional to the national populations).**

The Arts:

- Encourage the writing and illustration of narratives or poetry that appreciate nature and our connections to nature, and which express the problems deriving from its degradation.

- **Consider making drawings illustrating the differences between a natural and a degraded ecosystem, for example, a logged, dry forest, and a natural forest with different species of trees and plants, birds, insects, etc.**



Physical Education:

- Carry out role-play games in which stretching and strength exercises reflect the characteristics of birds, fish or sharks, tigers or wolves, or local fauna.

- **Carry out symbolic exercises that show the active struggle between an imaginary group of nature predators and another group that is proposing and achieving restoration, for example by recovering a forest. Highlight the competition and how the winning group manages to defeat the predators.**

Potential interdisciplinary activities

Once the subject-based contributions have been led by the team of teachers in the classroom, a shared Desirable Scenario is designed and agreed at the Interdisciplinary Roundtable. For example:

"The educational community and general public are aware of the importance of ecosystem restoration and assume the responsibility for contributing to the restoration of a local ecosystem, as part of the United Nations Decade on Ecosystem Restoration".

Once some details, approaches and scopes of the scenario have been drafted and specified, interdisciplinary activities are organised to achieve it at the educational centre and/or in the community.

VISIT AND ANALYSE ANY POTENTIALLY DEGRADED LOCAL OR REGIONAL ECOSYSTEMS, WITH A VIEW TO THEIR RESTORATION

Main theme and focus: Teachers and students at the educational centre learn about the problem of ecosystem degradation and discover the United Nations Decade on Ecosystem Restoration. The importance of being able to contribute locally is highlighted. Emphasise the importance of this issue for local, national and regional sustainable development. The idea is to achieve basic knowledge of the degradation of an ecosystem near the educational centre to raise awareness of the situation and potential restoration actions.

An eminently participatory approach is used, involving prior study by groups of teachers and pupils learning from their families and local experts. A visit is organised to a jointly agreed location nearby, to learn first-hand about the situation and future needs.

Main activities and preparatory steps:

1. **Preparatory phase:** An interdisciplinary group of teachers meets to discuss the main elements of the Decade and to analyse the overall situation of the ecosystems near the school. They propose sites where ecosystem degradation can be observed (a local park, a nearby river, etc). Local authorities and a few specialists are contacted to learn about the situation and check potential interest in restoring a particular site in the short to medium term. The students are asked to talk to their families and friends in order to propose a place of interest that needs restoration.

2. **Pre-organisational phase:** The site to be visited and reasons for this choice are defined based on the research, consultations and analysis carried out in the previous phase. Group discussions are then held to share the results of these reflections, so that the main themes and motivation for the visit are discussed at the education centre. The date for the visit is set. The best way to reach the site and the main aspects to look at are established. We recommend using a simple format or guide to note details that emerge when examining potential ecosystem degradation to define whether this is a question of deforestation, water pollution, introduced species, lack of fauna

or flora, etc. Reflect on the possible causes of such degradation: poor site management, poor visitor behaviour, activities that are incompatible with the needs of the site, etc. Finally, two or three groups of pupils of different ages examine the different situations of the ecosystem to be visited together with the group of teachers.

3. **Carrying out the visit.** ***Stage one:*** On arrival at the chosen location, the groups are organised so that everyone can observe and note down various (adverse) situations of interest on the form, along the way. For example, record any places where you see: plants that are not native to the area, deteriorated spaces, felled trees, contaminated water, rubbish, etc. Positive aspects can also be highlighted: perhaps native species replanting or good site maintenance. ***Stage two:*** The group stops to listen to the sounds of birds, to detect the presence of a few types of fauna that may be local or introduced. Every participant shares their impressions and discoveries. Stage three: At the end of the tour, the groups meet to share their experiences and take stock of what they have observed. Comment and analyse the details they noted down. This reflection forms the basis for proposing actions to restore the ecosystem visited. Hold a subsequent meeting at the educational centre in order to reach an agreement on the project to be carried out and to promote the restoration of the site visited in a participatory manner.

4. **Conclusions and proposal for action.** Based on the previous stage, an open meeting is held attended by educational centre management. The results and restoration proposal are presented, under the framework of the United Nations Decade on Ecosystem Restoration. Broad participation from several motivated and committed population segments and local groups who are aware of the situation is required to achieve the restoration project.

CAMPAIGN TO PROMOTE THE RESTORATION OF AN ECOSYSTEM NEAR THE SCHOOL TO RAISE AWARENESS AND PARTICIPATE IN THE UN DECADE ON ECOSYSTEM RESTORATION

Part 2. Once the previous visit has taken place, and based on the results and conclusions obtained, a meeting for participating students, teachers and parents' representatives is held to carry out a campaign to restore the ecosystem visited, as part of the United Nations Decade on Ecosystem Restoration, to raise awareness of the situation and boost restoration with concrete actions.

Main theme and focus: Carry out a broad campaign involving students, teachers, parents and the community to promote restoration of the ecosystems visited in the previous activity, as part of the United Nations Decade on Ecosystem Restoration.

Key activities to drive action:

1. **Preparatory design and action phase:** A basic campaign outline is designed in a participatory manner. It should include the implementation of a set of main actions, notably:

- Define the campaign objectives
- Determine who to target (general public, urban or rural communities, professionals, school children, etc.)
- Review the knowledge acquired in the prior research and during the visit.
- To raise awareness, discuss the main text of the UN Decade on Ecological Restoration, along with details about its implementation, and promote connections with other initiatives and the respective country's National Ecosystem Restoration Plan.
- Check the relevant details of the national and regional actions taken by your country and region.
- Analyse the main group or sectors that may be interested in being directly involved in restoring the visited ecosystem.
- Develop a core message that motivates people to act.
- Establish the means by which the message will be delivered (talks or discussions, posters put up locally, media interviews, etc).
- Name the team that will be responsible for the core tasks.

- Identify and define the potential support that could be obtained for the various stages of the campaign (financial, consultancy or implementation) and achieve the respective agreements.
- Define the support and monitoring groups.

2. **Implementation and monitoring phase:** Once the design and the previously established actions have been carried out, the campaign is implemented with the contributions received and the collaboration of the priority groups or sectors.

   At this stage, consider the possibility of becoming a partner[21] of the United Nations Decade on Ecosystem Restoration, based on the global Partnership Framework.[22] The possibilities are analysed and the form of partnership is defined, along with the option to register future restoration activities on the digital platform (Digital Hub).A phase of partial monitoring of the campaign results is carried out after the first actions, in order to receive suggestions and proposals for improvement.

3. **Final stocktaking phase and conclusions for the future:** After the implementation and follow-up phase, stocktaking meetings are held to assess the results obtained, the degree of public awareness of the United Nations Decade on Ecosystem Restoration and the real possibilities of initiating and carrying out concrete actions to restore the site visited.

   The aim is to establish the achievements and difficulties encountered in order to build on the campaign experiences, so that the initial objectives can be realised with a plan to restore the ecosystem.

   Part of the conclusions can be devoted to congratulating the group on their achievements and celebrating the willingness shown by most of the participating groups.

   Finally, various continuity options are proposed as it is important to gradually expand the number and nature of people or groups who know, understand and act to support ecosystem restoration in the area, as a way of contributing to their improvement and conservation, for the well-being of the entire population.

[21] Partners. (n/d). UN Decade on Ecosystem Restoration. Retrieved 15 April 2022, from https://www.decadeonrestoration.org/partners
[22] (n/d-h). Unep.org. Retrieved 15 April 2022, from https://wedocs.unep.org/xmlui/bitstream/handle/20.500.11822/34121/UNDPF.pdf

Evaluation of the activities carried out

The Desirable Scenario designed in the Interdisciplinary Roundtable is taken as the main reference for evaluating the activities carried out. In the case of ecosystem restoration, this scenario was: "The educational community and general public are aware of the importance of ecosystem restoration and assume the responsibility for contributing to the restoration of a local ecosystem, as part of the United Nations Decade on Ecosystem Restoration".

You can start from four general criteria, which can be refined through specific indicators developed in educational centres for the different educational levels, ages and subjects, and based on established pedagogical approaches.

EVALUATION CRITERIA	MAIN FOCUS	CENTRAL THEME: ECOSYSTEM RESTORATION						
		ACTIVITY 1. Visit and analysis of the situation of a degraded ecosystem to work towards its restoration			**ACTIVITY 2.** Campaign to promote the restoration of the site as part of the UN Decade on Ecosystem Restoration			**COMMENTS AND PROPOSALS**
		LEVELS			**LEVELS**			
		HIGH	MEDIUM	LOW	HIGH	MEDIUM	LOW	
KNOWLEDGE *Ecosystem restoration. UN Decade on Ecosystem Restoration*	*Extent to which understanding and internalisation of issues has been achieved*							
PARTICIPATION, INTEREST *Active presence during the various stages of the visit. Participatory design and collective implementation of the campaign.*	*Level of participatory process, motivation and commitment. Start and development of the proposed actions.*							
OUTPUTS OBTAINED *Main findings of the visit. Effective campaign.*	*Achievement of visible, concrete results during the visit and campaign. Launch of an ecosystem recovery plan.*							
FOLLOW-UP PROPOSALS *Suggestions received for continuity.*	*Implementation of the plan. New ideas or projects for the future.*							

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