

# WATER



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## 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 H<sub>2</sub>O, 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.

<sup>41</sup> 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<sup>41</sup>.

### WATER FOOTPRINT

Environmental 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](#)

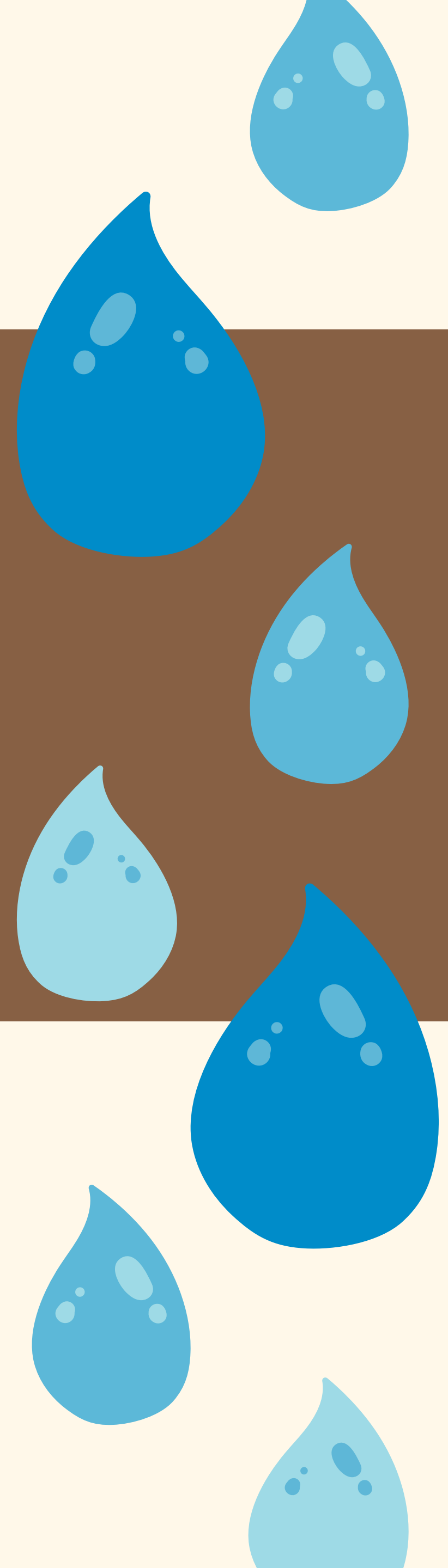
# Our connections with water:

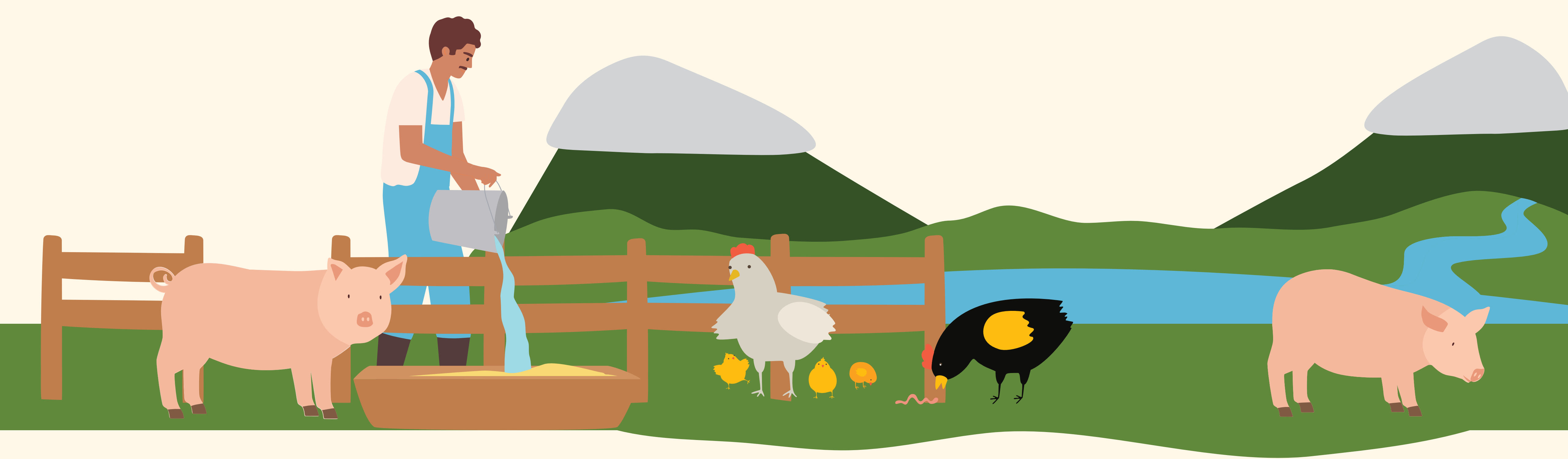
In 2010, the General Assembly of the United Nations recognized, through Resolution 64/292, the human right to water and sanitation, reaffirming that access to safe drinking water and sanitation are essential for the realization of all human rights.

[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 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<sup>42</sup>, 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.

<sup>42</sup> 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](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 km<sup>2</sup> with 225,000 km<sup>2</sup> in Argentina, 850,000 km<sup>2</sup> in Brazil, 70,000 km<sup>2</sup> in Paraguay and 45,000 km<sup>2</sup> 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<sup>43</sup>.

**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<sup>44</sup>.** A Quadrennial Report on Regional Progress and Challenges in Relation to the 2030 Agenda for Sustainable Development in Latin America and the Caribbean<sup>45</sup> was presented at the Latin American and Caribbean Countries Forum on Sustainable Development in 2019<sup>46</sup>. **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.**

<sup>43</sup> OAS. (2008). Environmental Protection and Sustainable Development of the Guarani Aquifer System. Department of Sustainable Development - Organization of American States. [https://www.oas.org/DSD/WaterResources/Pastprojects/Guarani\\_eng.asp](https://www.oas.org/DSD/WaterResources/Pastprojects/Guarani_eng.asp)

<sup>44</sup> Global Wetland Outlook. Ramsar Convention Secretariat. (2018). Global Wetland Outlook <https://www.global-wetland-outlook.ramsar.org/>

<sup>45</sup> 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>

<sup>46</sup> 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>



# Overview in Ecuador



**In Ecuador, water is a natural, strategic and public asset that must be used in harmony, integrating social, community, environmental, cultural, economic and political values<sup>47</sup>. For this reason, the Ecuadorian State promotes the connection of water resource policies with sectoral public water policies.**

In line with the Sustainable Development Goals, Ecuador has a National Water Quality Strategy, which aims to improve and protect the quality of water resources, their ecosystems, quality of life and food security, and ensure national control and monitor pollutants of natural sources<sup>48</sup>.

It is interesting to consider some joint studies carried out under the framework of national institutions with international organisations regarding the water situation in Ecuador. The 2017 diagnosis of water statistics in Ecuador, by the former National Water Secretariat (SENAGUA) and the Economic Commission for Latin America and the Caribbean (ECLAC)<sup>49</sup>, notes that Ecuador has a very diverse panorama of hydrological regimes and great heterogeneity in the spatial distribution of water, shaped by multiple physical and climate conditions. This provides advantages of complementarity, for example in hydroelectric power generation, as the summer seasons in the highland and coastal regions coincide with those of higher rainfall in the east; but this geographical diversity can also generate problems like droughts and floods.

<sup>47</sup> Constitution of the Republic of Ecuador, 2008

<sup>48</sup> Estratega Nacional de Calidad del Agua (National Water Quality Strategy), 2016

<sup>49</sup> ECLAC (2017). Diagnóstico de las estadísticas del agua en Ecuador (Diagnosis of Water Statistics in Ecuador). <https://silo.tips/download/diagnostico-de-las-estadisticas-del-agua-en-ecuador-informe-final>

## The Diagnosis of Water Statistics in Ecuador makes several observations on national water resources and drainage basins:

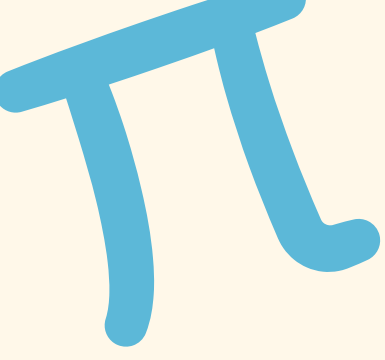
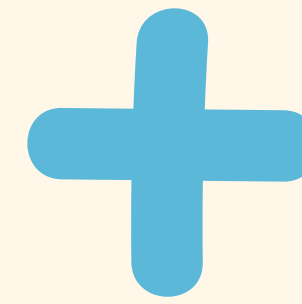
- **The deterioration** of drainage basins, which has altered hydrological parameters and consequently the volumes of occurrence is accelerating, making the impact of floods and droughts more intense.
- Although **groundwater resources** are abundant in several basins, there are no reliable statistics about their potential or the volumes of water used. Similarly, few studies have been carried out and there is limited experience in their use, which makes it impossible to make the best use of them.
- **Water resources** are subject to persistent pollution by urban waste, or discharges from export agriculture, oil, mining and agro-industrial areas. This information is the most limited and data collection is further complicated by an intricate overlap of functions between institutions involved in water management.

In 2016, a Clean Water and Sanitation study on the results and progress of the Sustainable Development Goals in Ecuador, in particular SDG 6, was also conducted: It noted that 70.1% of the population uses a safe water supply for drinking, i.e. an adequate, nearby, sufficient and quality water supply (piped, well or protected spring bottled water).



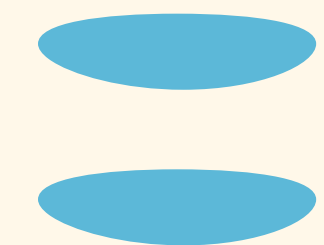
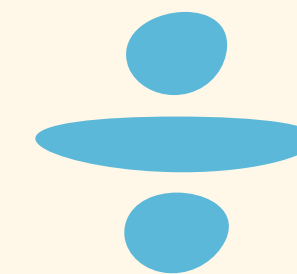
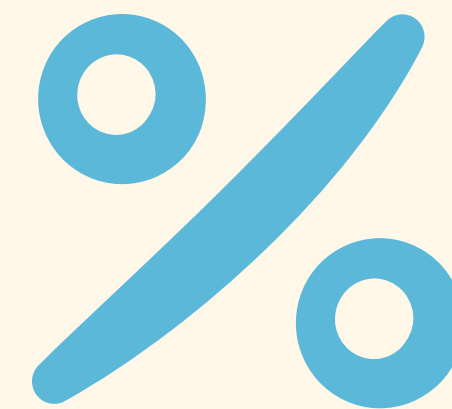
# Thematic contributions:

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<sup>50</sup> 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<sup>51</sup> or online calculators. Recommended website for water footprint calculation: <https://www.watercalculator.org/wfc2/esp/>



<sup>50</sup> 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.

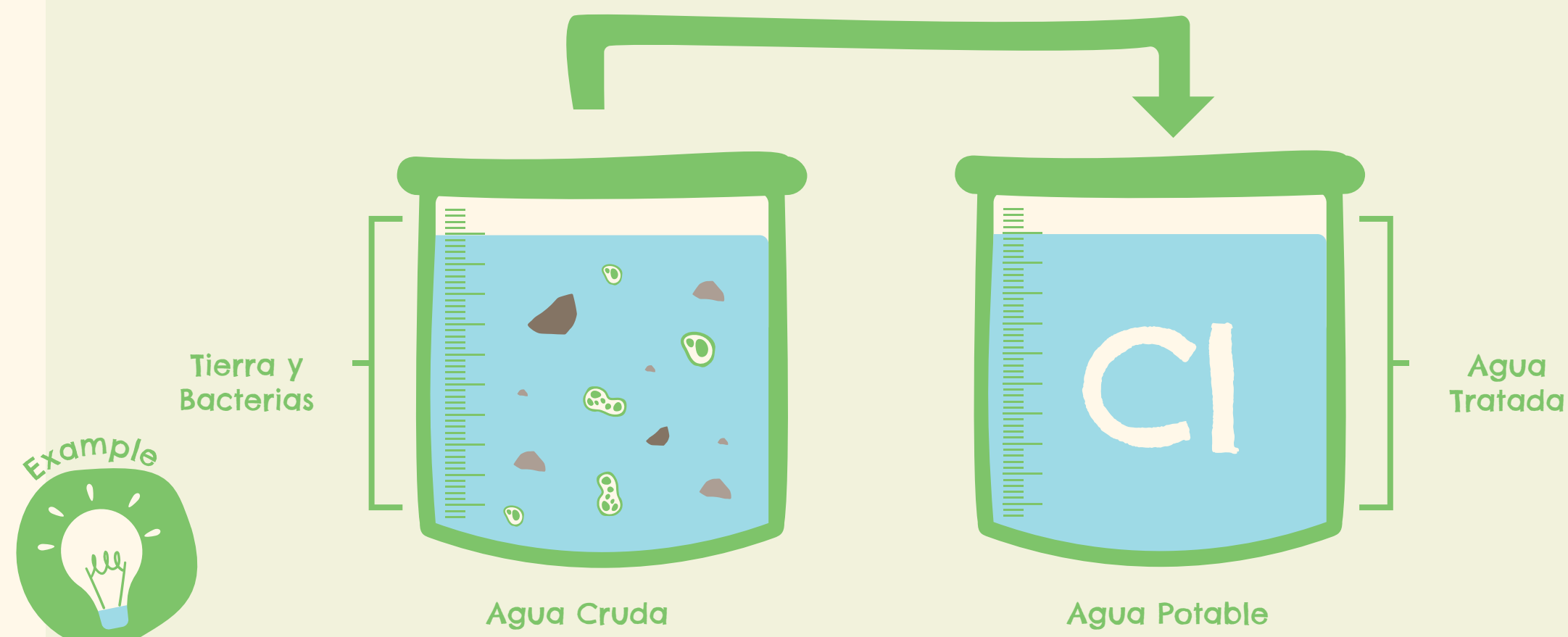
<sup>51</sup> Producing one litre of milk requires 1,000 litres of water, one kilo of maize requires 900 litres, one kilo of wheat requires 1,300 litres, one kilo of beef requires 16,000 litres, one kilo of chicken requires 3,500 litres, 1 kilo of rice requires 3,000 litres. To produce one kilo of cotton 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.

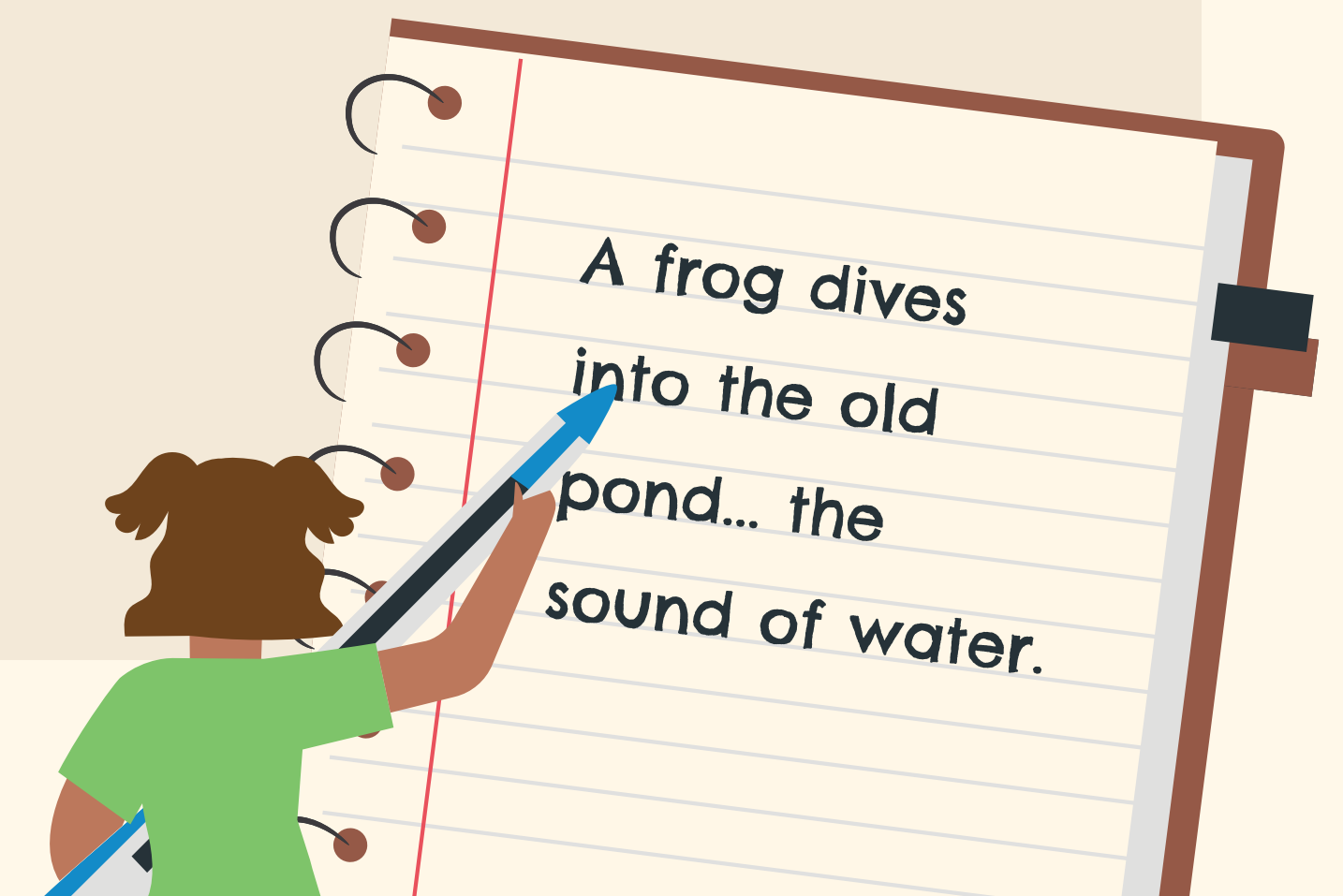
• **Explain water purification and treatment processes. Recognise those at home and/or in school. Visit to the city's water treatment facility.**



## 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<sup>52</sup> 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.**

<sup>52</sup> 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.



## 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.**





## 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.**

Example



# 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<sup>53</sup>, 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.

<sup>53</sup> 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.

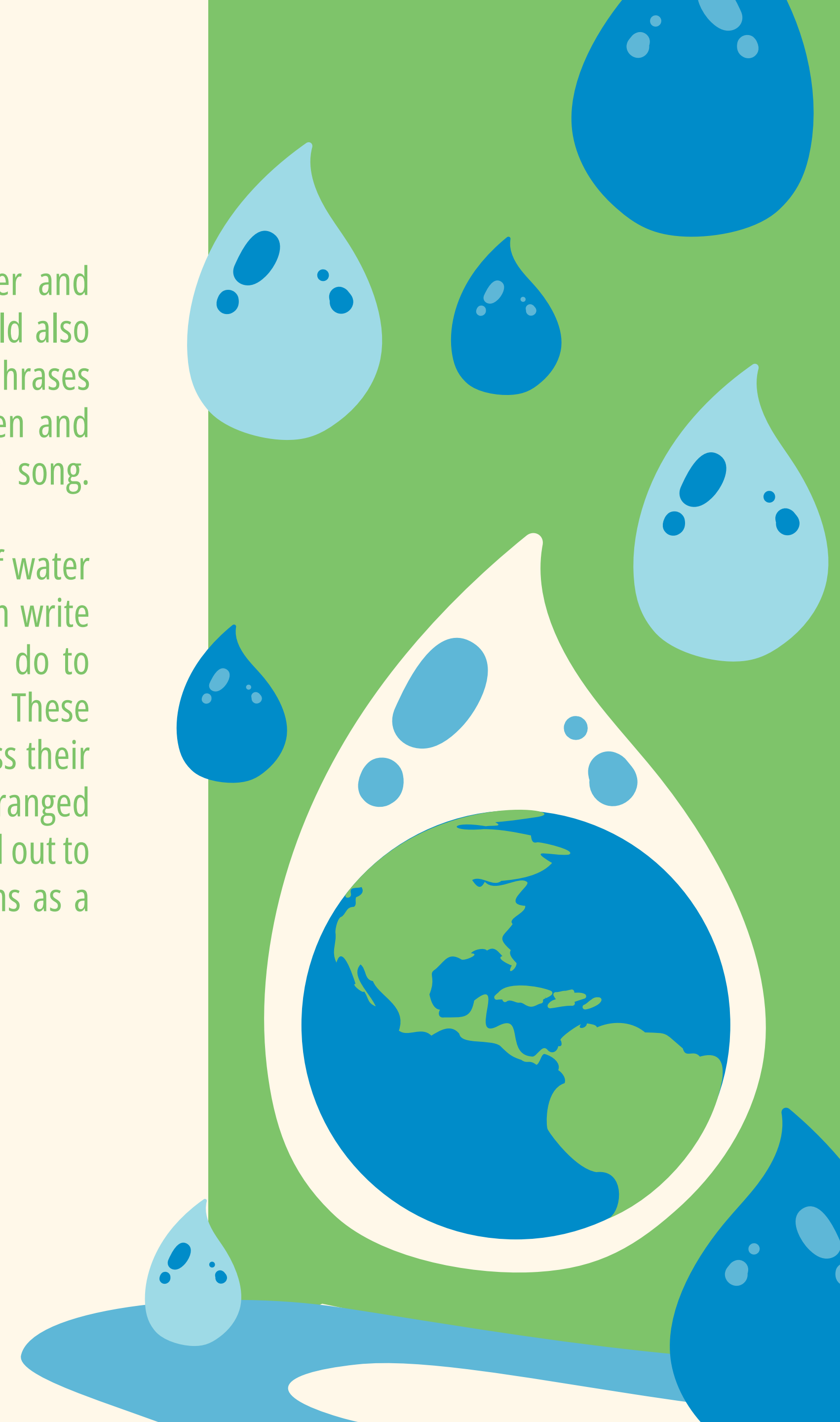
**3. Water worship ceremony:** Prior student research into indigenous or local communities and their water customs, traditions, myths and ceremonies. Consultation with parents, teachers and authorities. Organisation of a public water worship ceremony based on these consultations, performed by students, 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<sup>54</sup>. 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.

<sup>54</sup> 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.

		CENTRAL THEME: WATER						
EVALUATION CRITERIA	MAIN FOCUS	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	
<b>Knowledge</b> <i>The value of water, the water cycle, watersheds, the water footprint.</i>	<i>Extent to which understanding of key issues has been achieved</i>							
<b>Participation and interest</b> <i>At the ceremony, at the exhibition, in the games</i>	<i>Level of participatory process, motivation and commitment</i>							
<b>Outputs obtained</b> <i>All ideas, commitments. Study for action</i>	<i>Achievement of visible, concrete results</i>							
<b>Follow-up proposals</b> <i>Shared ideas for further action.</i>	<i>Presence of new ideas, projects and suggestions</i>							

# Rationale for the Guidelines

**Environmental education is transversal. As an effective 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 promotes action, cooperation, and the exchange of experiences and knowledge in environmental education, both face-to-face and online.

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.

