



LESSON 8

Water

Sophia remained silent, enjoying that single moment of her life and understood why Prince Solo had fallen in love for Earth. Waters tumbled from a height of 100 meters, and columns of spray formed along two kilometres of the border. Even from afar, you could enjoy the show and feel the coolness of the water. The princess felt small before such force and beauty. Nothing could be compared to that in Uno: it was breathtaking. (Prince Solo's Waterfall - Chapter VIII, the Mission Sofia on Planet Earth)

The Blue Planet

Our planet is blue because almost its entire surface is covered by water that reflects the blue colour of the sky or the atmosphere. Yuri Gagarin, the first astronaut to travel outside the planet saw it from space and said: the Earth is Blue!

The Earth now has 7 billion people and different types of life forms, animals, and plants that need water to live.

The greater amount of water is in the oceans, but we cannot drink this water because it is salty. We can only drink 2.53% of the water that exists on the planet.

A portion of this water is frozen or below the ground and it is difficult to use it.

What water is made of?

Water is made of chemical elements.

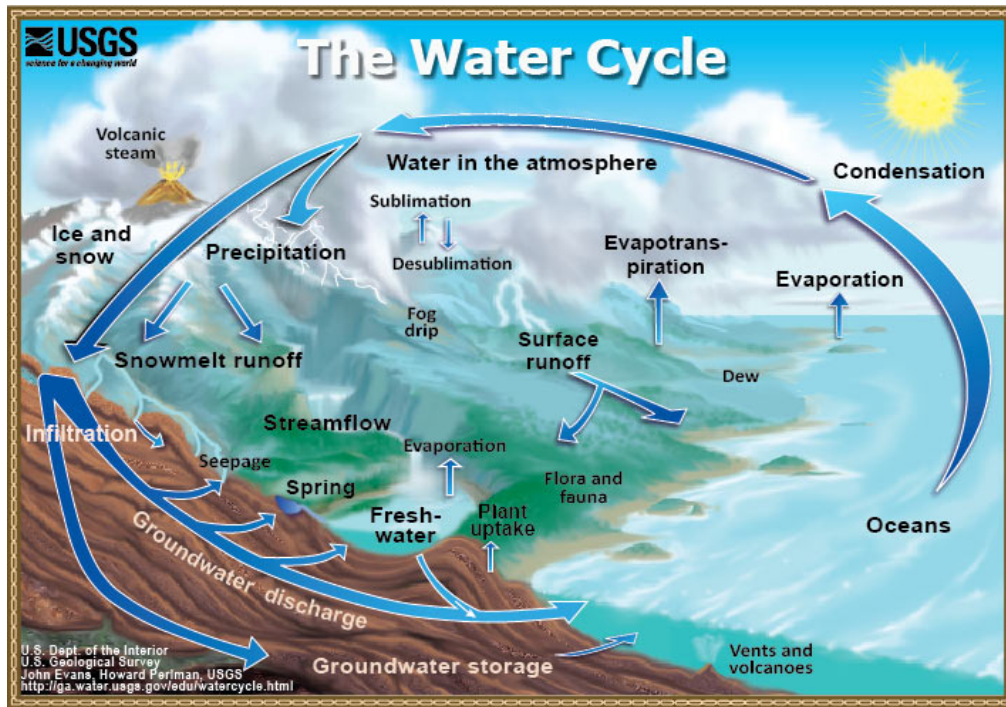
Water is made of two hydrogen atoms + one oxygen atom = H₂O.

Water has no taste or smell and appears colourless when found in small quantities. A larger volume of water appears with a very light shade of blue.

The water may appear liquid when we drink, but it can also be in our ice drink or come out as steam of the hot water from the kettle.

Water is transparent and plants that live under water can grow and receive the sunlight.

Water is always renewing itself in a cycle: men and animals drink from rainwater and plants depend on water to growth. The water that falls from the sky goes into lakes and rivers and then into the sea where it is mixed with the salt water. This water will evaporate and form other rains starting a new cycle of water.



Water sources

Rain is the main source of water for every kind of human activity and ecosystems. The rain is absorbed by plants and soil and evaporates into the atmosphere by evapotranspiration. Rainwater goes to the lakes, the wetlands and the rivers that flow into the sea. The water's evapotranspiration sustains forests, plantations, livestock and ecosystems.

All living things depend on water. Other water sources are wells and aquifers.

The world's largest river is the Amazon with 6992.06 kilometres and the Nile is 6852.15 kilometres.

The world's largest lake is Lake Victoria in Africa and belongs to three countries: Kenya, Uganda and Tanzania.

The largest aquifer in the world is the Guarani. Most are in Brazil and the rest in Argentina, Paraguay and Uruguay.

The amount of water in Nature is the same since man began to inhabit the Earth.

Daily water

Water is in every moment of our lives. We need it to quench thirst, brush teeth, cooking, water the garden, wash the dirty laundry and get everything cleaner, healthier and more beautiful. Have you ever imagined a day without using a bit of water? Impossible. Water is the source of life, food and energy.

The water we use daily has a cycle that is called the urban water cycle and has two circuits:



1 – First there is the **catchment and afterwards the water treatment**. Water is then distributed until it arrives to the tap of each consumer: homes, industries, schools, institutions etc.

2 - From **tap or site of use**, the water goes through home or facility and then into the sewer or sewerage system. The sewage network has sanitation or wastewater treatment and then the water returns to where it came from: the environment.



Considering the amount of water we consume in our daily lives, we must be careful to not run out of water.

Since humans have begun to grow crops, they have used water to irrigate these plantations. And the more the population grew; more water was needed for agriculture.

In today's world, agriculture uses artificial irrigation because rainwater is not enough. Some regions have almost no rain and only have this option.

According to the Food and Agriculture Organization, FAO, agriculture uses 69% of the drinking water that exists on the planet. A farmer spends 25 litres of water to produce one potato.

After agriculture, the industry consumes more water and uses 22% of the fresh water in the world. To save water, the industries should reuse the water in their manufacturing. Some industries are already doing this and saving the virtual water products.



What is virtual water?

All products require water to be manufactured. They are not made of water, but water used in the production process is called virtual water. Check it out:

PRODUCT	Quantity	Liters of water
Chips 32MB	2 grams	16.000
Beef meat	1 Kg	13.500 a 20.700
Cheese	1 Kg	5000
Chicken	1 Kg	3900
Cotton	1 shirt	2700
Hamburguer	1 unity	2400
Soy	1 Kg	1800
Sugar	1kg	1500
Wheat	1 Kg	1300
Barley	1 Kg	1300
Milk	1 liter	1000
Corn	1 Kg	900
Eggs	1 unity	200
Bread	1 unity	40
Beer	1 cup	75
Paper	1 sheet A4	10

A computer consumes 1500 kilos of water because the materials used in its fabrication require multiple washes of very pure water. It takes more water to manufacture a computer than a refrigerator.

The industry is responsible for the use of the second largest part of water in the world and 22% of fresh water. We already know that the modifications that humans have made in waterways affected the global water cycle and population access to water. Companies have already started, but must continue to take steps to seize ever more water, as capturing rainwater.

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The water that comes from heaven is not completely pure because every drop brings some of the atmosphere of the place, which may have dust, soot, bacteria etc. What we can do is keep it in some kind of container and filter it or use it to wash the floor, for example.

The Oceans

The ocean water is essential for biodiversity and all natural cycles and for producing food. We consume 160 tons of fish per year.

In Brazil we have plenty of water in lakes, rivers and waterfalls and one of the largest coastlines in the world, with about 8000 km. The ocean waters that bathe Brazil have a wide variety of fish and other species. The reefs provide protection and food for different fish species and elements to make medicine. Corals are natural barriers that protect beaches and coastlines from waves and storms.

Brazil needs to take better care of seawater: we can find many polluted seas with almost no fish.



The exaggerated tourism, illegal constructions, throwing sewage at sea and carelessness of people going to the beach are polluting the ocean. The amount of fish is decreasing because of the extinction of species and uncontrolled fishing.

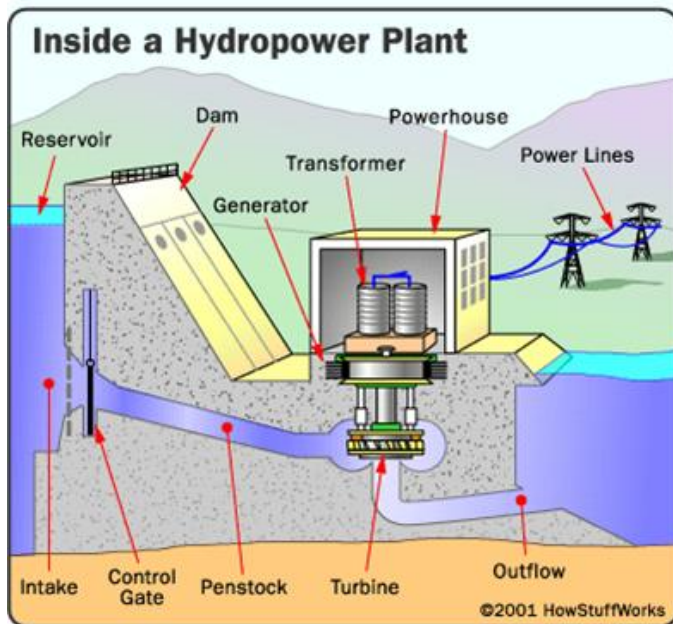
The ocean is a source of wealth and families depend on its natural resources to make money and survive. Water is money.

The oceans can also produce energy by the size of the waves, the strength of its currents and changing tides and this force is used. The strength of the current oceans drives turbines. It is not easy and is expensive, but in some places they are already using this clean energy that never ends, because there will always be waves and tides.

Water = Energy

The main source of energy in Brazil comes from hydroelectric plants using water to produce electricity.

The word "hydro" comes from the Greek and means water. Electric is the quality of this water. The force or energy produced by moving water is harnessed to generate electricity. This force is possible moving water in a stream or river, for example, by its fall into a waterfall.



In hydropower, water is piped from the river and will rotate the propeller turbine and generator to produce electricity. Wires to large cities transmit electricity. When water is in environment, it runs rampant and the strength of current produces the necessary pressure, but in hydroelectric plants the water is stored in reservoirs created by the dams and then used according to the necessity.

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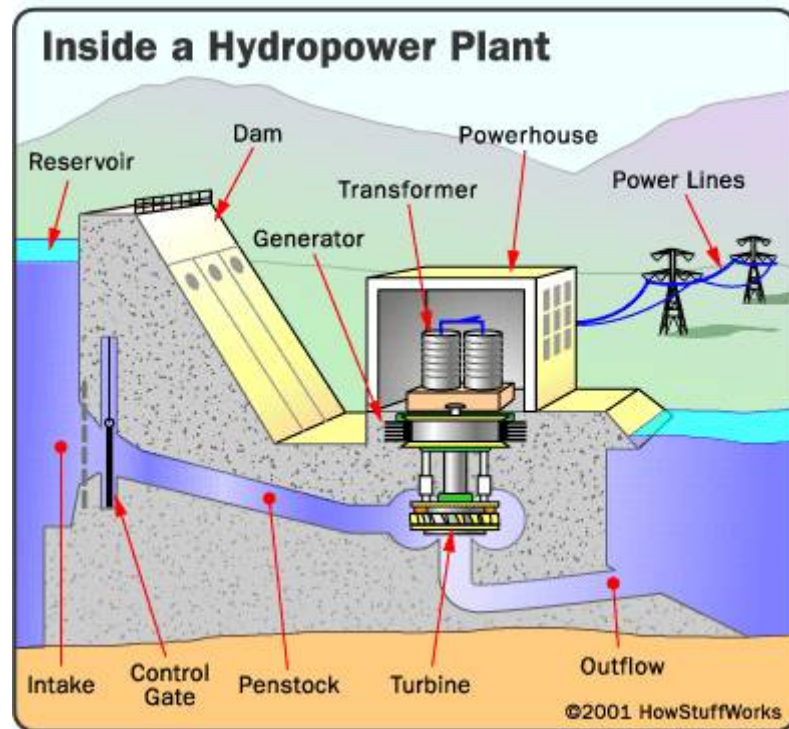
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The hydroelectric plant is a renewable energy source because the water of the river does not end. It is always being renewed with the rains.



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The largest hydroelectric dam in the world is Brazilian Itaipu on the Paraná River Basin.

Water goes missing?

Australia is the continent with less water and now suffers from desertification. Almost all major cities in Australia now have to save water. The country is committed to save the river system and restore the flow of water.

Japan has enough rain, but with a large population, the amount of water for each person is small. Japan has to import water from other places. In contrast, in poor parts of Africa water is scarce and does not meet the needs of the population.

WATER CONSUMPTION PER CAPITA (PER PERSON) IN RESIDENTIAL AREAS

Japan and North America 350 litres per day
Europe - 200 litres per day
Sahara Africa - 10 to 20 litres per day

Although most (70 %) of the area is covered by water, the future may lack water for many people. She is in many places, but not always in the places where we need it. The water is not evenly distributed.

For example, South America (South America) has 26% of water in the world and only 6 % of the population. Asia also has plenty of water, 36%, but the population is 60 % of the world population.

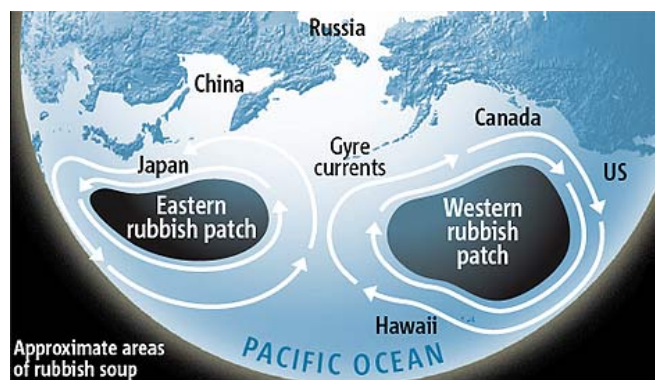
Some people live in deserted places and need a lot of water to irrigate their crops and quench thirst. In these places it is difficult to get water. Water can get away from the place where people live and many cannot afford to pay for the transportation. How to bear the weight of a bucket? The situation worsens when besides the lack of water, the water is dirty.

It is also important to have clean water. Many children in poor regions such as Africa get sick because the water is not treated and live in places where there is no sewer. People drink polluted water and get sick.

Each year, we consume more water: there are more people drinking water and using water in agriculture and industries. And each year we also have less water because they do not use water in the right way.

Per day are roughly two tons of waste that goes to water, including waste from industry, households and agriculture. All sewage from our homes and industries should be treated before going to the sea. The oceans are not able to absorb so much garbage and dirt.

In the Pacific Ocean, currents carry the debris to a region that became the largest landfill in the world, with 100 tons of garbage.





More and water is important in our lives and we should take care of it, without wasting anything. We cannot be lazy to solve the problem. The longer we postpone, the situation will worsen. We must learn to use water so we will not miss.

How to get more water?

The amount of water on Earth is the same since the first inhabitants on the planet, but the population continues to grow. Then surely we have to save water.

Firstly, we have to change our attitude towards water and hope it will not be missing to anyone, by following these tips:

1. Do not remain in the bath a longer time than necessary.
2. Close the tap water while brushing your teeth and save 10 PET bottles full of soda water.
3. Do not use the toilet as a wastebasket. Every time we spend discharge 10 litres of water. Throw trash in the trash.
4. Close the faucets and avoid ripping water.
5. Pay attention if a pipe is leaking in your home, school or office and alert to be able to fix it immediately.
6. Turning off the light also saves water because in Brazil most of our energy comes from hydropower.
7. Do not waste water to bathe your dog.

What can countries do?

Developing country governments must also do their part:

1. Value water and its sources as streams, aquifers, water holes. Conserve the environment of the watershed that is the source of water for people and nature.
2. Balance the consumption of water with its conservation and maintain sufficient water to preserve rivers, lakes and other water sources.
3. Modify and repair equipment that is old to improve the amount of drinking water and its quality.
4. Rationalize agriculture, which is the activity that uses the most water.
5. Reduce contamination of water. The chemicals used in food crops are major agents of water pollution. Products we use in everyday life as soap and detergent also contaminate the water.
6. Learn more about water and understand their cycles like steam and on the water supply as aquifers.
7. Understand how climate change with periods of heavy rainfall and other dried can affect terrestrial ecosystems and water supplies.

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