

THE WATER CYCLE

THE FOUR MAIN STAGES OF THE WATER CYCLE

KEY WORDS

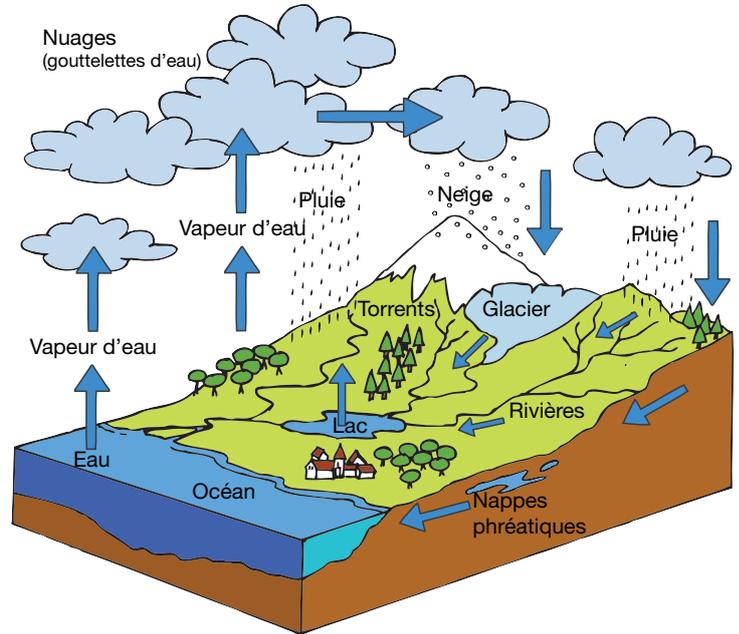
Evaporation
Precipitation
Streaming
Seepage
Groundwater
Fresh water

1/ The heat of the sun causes **evaporation** of ocean surfaces, waterways and water contained in plants.

2/ Vaporised water then creates clouds, which are carried by the wind.

3/ Close to land elevations, storm clouds burst and water is returned to the ground through **precipitation** (rain, snow, hale)

4/ In liquid form, water then either **seeps into** the soil until it meets **groundwater** or it streams along **ridges** to create waterways that eventually end up in the oceans.



THE OCEAN PLANET

Water covers almost three quarters of the earths' surface. Fresh water only represents 3% of this liquid mass. Two thirds of all fresh water is trapped in the form of ice (in glaciers and the polar caps...).

The amount of liquid fresh water available to humans therefore represents less than 1% of the total volume!

Thanks to its cycle, water circulates and is regenerated but at the same time it also washes polluted waters into the oceans. **Thus, water is very precious and needs taking care of.**

DAILY ACTIONS

Avoid wasting water : don't leave the tap running (while washing up, brushing teeth...), choose a shower over a bath, reduce flushing and use toilets with low flow options, use economical settings on domestic electrical appliances and make sure there are no water leakages.

Avoid polluting : choose tap water over bottled water, throw nothing into waterways, the environment or into toilets, reduce the use of detergents and do not use harsh chemicals, if necessary, wash the car at a car-wash, not on the street or in the garden.

DID YOU KNOW?

Average water consumption
1 bath = 150 to 200 litres of water
1 shower = 30 to 80 litres of water
Single flush = 10 to 20 litres of water

210 litres per person per day in France
20 litres per person per day in Africa

1 out of 6 inhabitants of our planet
has no access to water.



TO FIND OUT MORE...

www.cieau.com
www.planete-eau.org
www.lesagencesdeleau.fr
www.surfrider.eu

NATURAL MARINE DEBRIS

NATURAL MARINE DEBRIS : DEFINITION

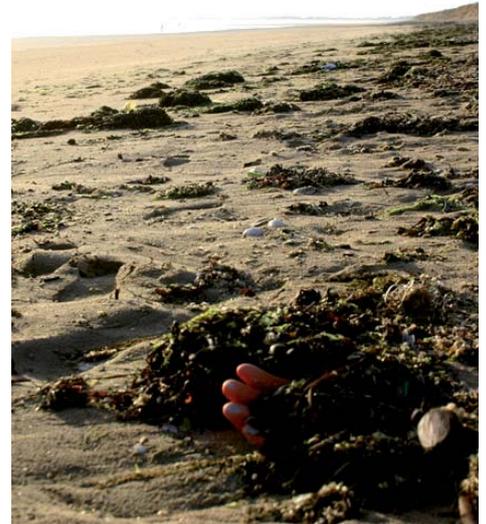
KEY WORDS

Food chain
Ecosystem
Selective collection
Natural waste

It's what the ocean leaves behind on the beach after high tide. It consists of flotsam carried to shore by the sea : seaweed (70 to 80 %), seashells, driftwood and animal remains...

Natural marine debris forms the basis of the food chain in the ecosystem of the foreshore because it also contains bacteria, which provide nourishment to the beach by decomposing organic matter. Numerous small creatures, like crabs and sand hoppers, take advantage of this living space as it provides both nourishment and protection.

The leftovers from king tides may even serve as a nesting space for certain species of bird (for example the Kentish Plover). **Natural marine debris is therefore essential and not to be considered as pollution.**



THE PROBLEM WITH SOLID WASTE POLLUTION

When man-made waste ends up in the sea it is carried to shore by oceanic currents and becomes part of marine debris.

This refuse often consists of plastic bags, nurdles, petroleum hydrocarbon remnants, fishing nets and other residuals.

Cleaning machines with rakes are used to remove litter and tidy the beach. Yet at the same time, they destroy natural marine debris, thereby endangering the entire ecosystem of the foreshore. A tidy beach is therefore not necessarily a living beach.

In order to leave natural marine debris untouched and remove only man-made litter, it is advisable to practice only manual, selective collection methods.

DAILY ACTION

Protect natural marine debris : do not collect natural materials (seaweed, driftwood, seashells...). Do not dispose of anything in the environment, in the mountains, the waterways, the beaches, the city or in toilets...

Take part in beach cleaning activities like the 'Ocean Initiatives', organised by Surfrider Foundation Europe and held during the first weekends of spring.



TO FIND OUT MORE...

www.conservatoire-du-littoral.fr
www.ifremer.fr
www.bretagne-vivante.org
www.initiativesoceanes.org
www.surfrider.eu

DID YOU KNOW ?

The average volume of litter found annually on the beaches of the Cote Landaise alone adds up to 15000 m³.

You can find supermarket trolleys, bicycles, plastic chairs and cotton buds (thrown into the toilet and passed through water purification stations!) on the beach.

SOLID WASTE POLLUTION

SOLID WASTE POLLUTION : DEFINITION

KEY WORDS

Plastic waste
Dumping
Pollution
Physical-chemical
Accumulation zone
Pathogenic Agents

It is a term for man-made waste (basically consisting of plastic litter) discarded in the environment and often found in the sea or along the coastline, either floating on the surface or submerged.

It is a result of consumers' waste disposal (on streets, in car parks, in sewers, through random dumping), inappropriate rubbish collection, and agricultural and industrial activity in general, as well as marine activity (fishing, shellfish farming, recreation, harbours and marine transport).

Once discharged into rivers or the sea, solid waste pollution is carried by the water cycle and ends up in accumulation zones : in river mouths, estuaries, on the coast or in the sea.

THE IMPACT OF SOLID WASTE POLLUTION ON OUR ENVIRONMENT

The inevitable impact : By preventing the reciprocation between water and sediments, plastic litter may be the cause of suffocation of organic matter on the sea floor.

Some marine species suffocate by mistaking litter for prey (marine mammals and turtles often consume plastic bags), others become entangled in fishing equipment (nets, lines...). They sustain injuries and become incapable of escaping from predators.

The physical-chemical impact : poisoning is a common occurrence as a result of contaminating toxic products or pathogenic agents (batteries, packaging containing solvents or detergents). The damage caused by certain litter lies at the heart of physical-chemical pollution : plastic bottles release volatile chemicals such as bisphenol A and phthalates into the water. These harmful components then enter the food chain and eventually accumulate in the tissues of the organisms themselves.



DAILY ACTION

Consume effectively to minimise the production of litter : Choose reusable bags (shopping bags, bags made from fabric...) when going shopping. Choose reusable products (non-discardable) and products with less or no packaging or even better with recycled packaging.

Reduce the amount of litter in the environment : Recycle household rubbish and do not dump rubbish into the environment or in the city. Pick up litter on the ground even if it's not yours.

DID YOU KNOW ?

The Pacific Ocean has an immense drifting layer of refuse which grows daily.

Its surface area has currently reached 3.43 millions km², that's a third of Europe!

The whirling currents draw together litter from all the oceans of the world and create this floating discharge.



TO FIND OUT MORE...
www.surfrider.eu/environnement
www.initiativesoceanes.org

OCEAN POLLUTION

POLLUTION ORIGINATING ON LAND

KEY WORDS

Water cycle
Bacteria
Heavy metals
Solid waste pollution
Hydrocarbon compounds
Invader species

Eighty percent of ocean pollutants originate on land, meaning that they stem from human activity ashore and not in the marine environment.

Various pollutants are carried by the water cycle from the mainland (cities, countryside, mountains...) to the oceans: when it rains, water streams along roads, into drains and channels... and washes compounds like hydrocarbon pollutants, fertilizer residuals and agricultural pesticides from the ground into the rivers...

All these pollutants eventually end up in the ocean, where they travel, carried by oceanic currents and finally return to the coast- or shoreline.

VARIOUS MARINE POLLUTANTS

Bacterial pollution : Consists of bacteria found in (improperly treated) wastewater from domestic and agricultural discharge.

Physical-chemical pollution : These are detergents (washing powder), hydrocarbon compounds (and petroleum), biocides and heavy metals stemming from urban, marine, domestic, agricultural and industrial use.

Biological pollution : Consists of introduced animal or plant species that invade a balanced environment endangering existing local species (Red-eared slider, Japanese Knotweed).

Mechanical pollution : It's the most visible form, consisting of macroscopic pollution (Solid waste) carried mostly by waterways.

Radioactive pollution : These are radioactive traces from nuclear power plants or hospital waste (radiological treatments).



DAILY ACTION

Do not dispose of any litter in the environment, in waterways, in mountains, on the beach, in the city or in toilets...

Be an environmentally friendly consumer : by using washing powders and cleaning products that do not harm the environment, reducing the amount of litter, avoiding the use of chemical fertilisers and pesticides in gardens.

DID YOU KNOW?

It is estimated that in Europe, fifty percent of all wastewater remains untreated and ends up directly in waterways.

The « lollipop sticks » found on the beach are in fact cotton buds thrown into the toilet. Passing through the grills of purification stations they end up first in waterways and then in the ocean.



TO FIND OUT MORE...

www.ifremer.fr
www.polmar.com
www.surfrider.eu

THE OCEANS AND THE CLIMATE

CLIMATE : DEFINITION

Climate, unlike weather, is defined by specific atmospheric conditions in a certain area at a given moment (sunshine, precipitation, temperature, humidity).

The various climates of the planet depend on their geographical location: temperate (like in western Europe), tropical, equatorial and polar...

KEY WORDS

Energy
Climate
Distribution
Density
Oceanic currents
Gulf Stream

THE EFFECT OF THE OCEANS ON CLIMATE

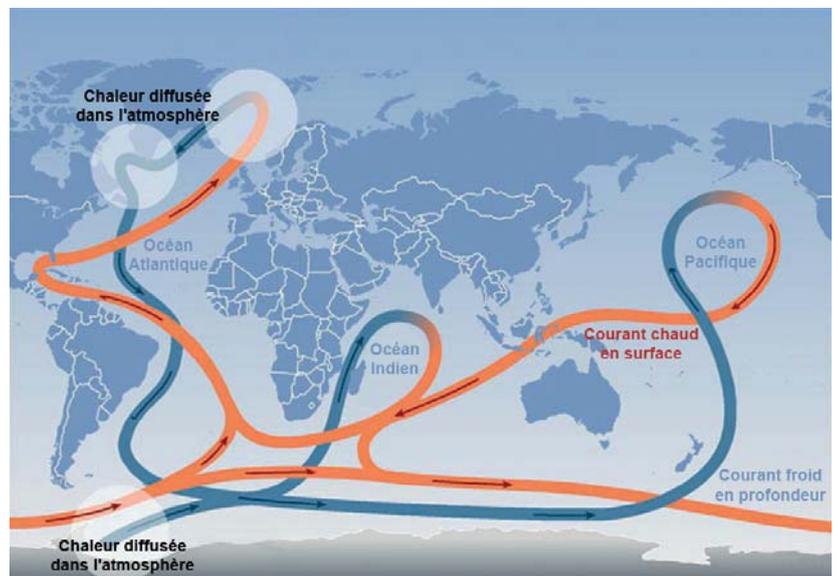
The sun transfers its **energy** to the earth by warming the oceans. At the equator, water stores this heat and dispels it toward the poles with the help of warm **ocean surface currents** (marked in red on the chart).

On its way to the poles, water then cools down and its **density** increases. Thus, it becomes heavier and sinks to form cold currents at depth, which return from the poles to the equator (marked in blue on the chart).

The combined currents form the ocean conveyor belt.

Oceanic currents stand in close relation to atmospheric air : heat exchanges are a permanent aspect of ocean-atmosphere interactions.

Through this thermal exchange, oceans influence the climate considerably, **distributing** the heat of the sun across the earth.



TRUE OR FALSE?

- 1 • Cold water is lighter than warm water.
- 2 • The density of water is proportionate to its salinity.
- 3 • Salts contained in the sea evaporate and appear in vapour.

Solutions :

- 1 • False: cold water is denser and therefore heavier than warm water, that is why it sinks to depth
- 2 • True: the higher the content of mineral salts in water, the higher its salinity and the denser it is.
- 3 • False: when water evaporates it discards its salts and turns into fresh water. Salts remain in liquid, not vaporised water.



TO FIND OUT MORE...
www.meteofrance.fr
www.ifremer.fr
www.surfrider.eu

DID YOU KNOW ?

The mild climate of Western Europe is due to the Gulf Stream, a warm surface current that carries warm waters from the West Indies to Europe.

Litter found in the sea in Guadeloupe could travel to the north of Europe in just a few days.

SORTING AND RECYCLING

THE WASTE PRODUCTION

KEY WORDS

Incineration
Recycling
Selective sorting
Composting
Organic waste

The earth's population and its standard of living won't cease to grow. Our life style produces more and more waste: the purchase of personal goods or frozen food in bulky packaging; the increasingly common appearance of domestic appliances with ever shortening life spans; advertising material invading our letter boxes...

Annually, we produce 360 kilograms of waste per person and this amount grows by one percent every year.

Everything that is thrown into a normal rubbish bin is buried or **incinerated**, thus producing toxic gases (dioxin...). Packaging material represents a third of the total volume of our litter **but we can easily reduce that quantity!**

SELECTIVE SORTING

Currently only twenty percent of all waste is recycled, even though towns have organised and are enabling pro-action: by installing sorting stations, reducing dumping, informing the public and by making containers available and collecting them.

Selective sorting enables : **the recycling** of packaging (glass is turned back into glass, plastic bottles are used to produce synthetic sweaters, paper is turned back into paper...), the **composting** of green waste and the treatment of dangerous refuse.

Thanks to waste recycling we save on raw materials, both water as well as energy, necessary during the production of goods. This in turn permits a reduction in pollutants: less waste to eliminate and less toxic substances in the environment.

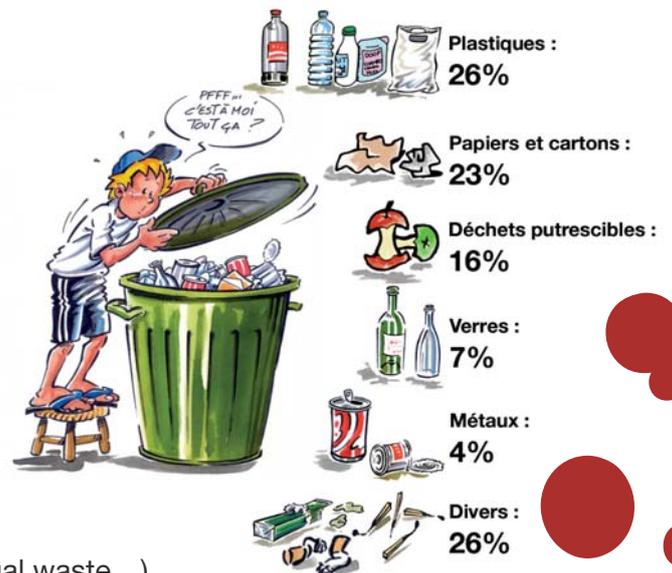
DAILY ACTION

Reduce your waste production :

by sorting your litter, by choosing goods with little or no packaging, by refusing advertising material in your letter box (use a sticker « No Advertising material »), by limiting the use of printed paper and by using recycled products.

Promote the sorting of waste and recycle your litter :

by placing your litter in the correct bin (glass, plastic, residual waste...), by composting **organic wastes** (food rests, green waste...), by bringing old domestic appliances to associations in charge of repair or recycling (Emmaüs...)



DID YOU KNOW ?

Fifty percent of the content of our bins is recyclable or can be placed into a compost!

In Europe, the amount of waste produced annually by a single nation corresponds in height with Mont Blanc (that's 4807m)!

This logo signifies that the product is recyclable, granted it is disposed of in the right place.



TO FIND OUT MORE...

www.ecoemballages.fr
www.reduisonsnosdechets.fr
www.ecologie.gouv.fr
www.surfrider.eu