

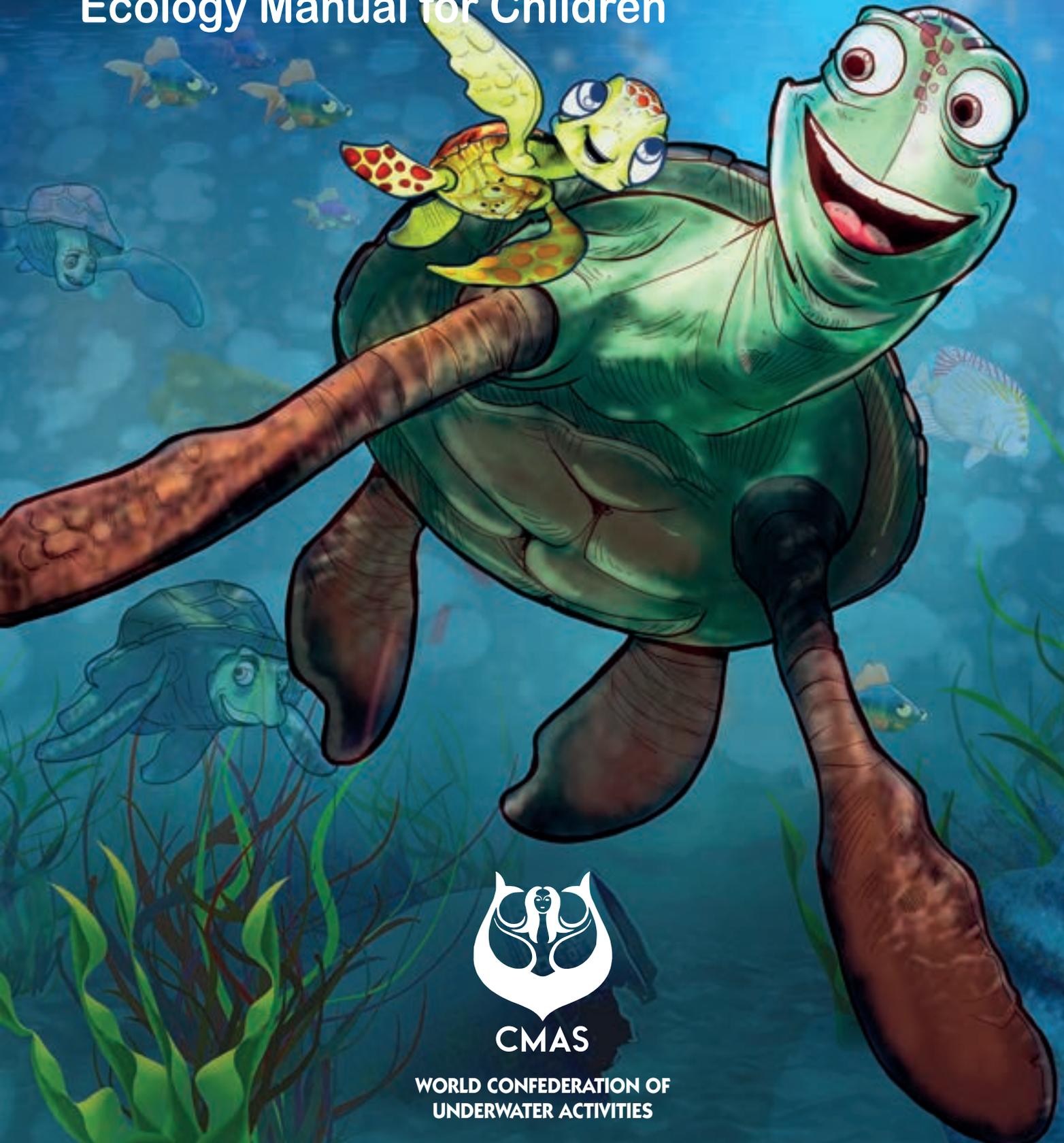
CLEAN OCEANS PROJECT



MANUAL

Ecology

Ecology Manual for Children



CMAS

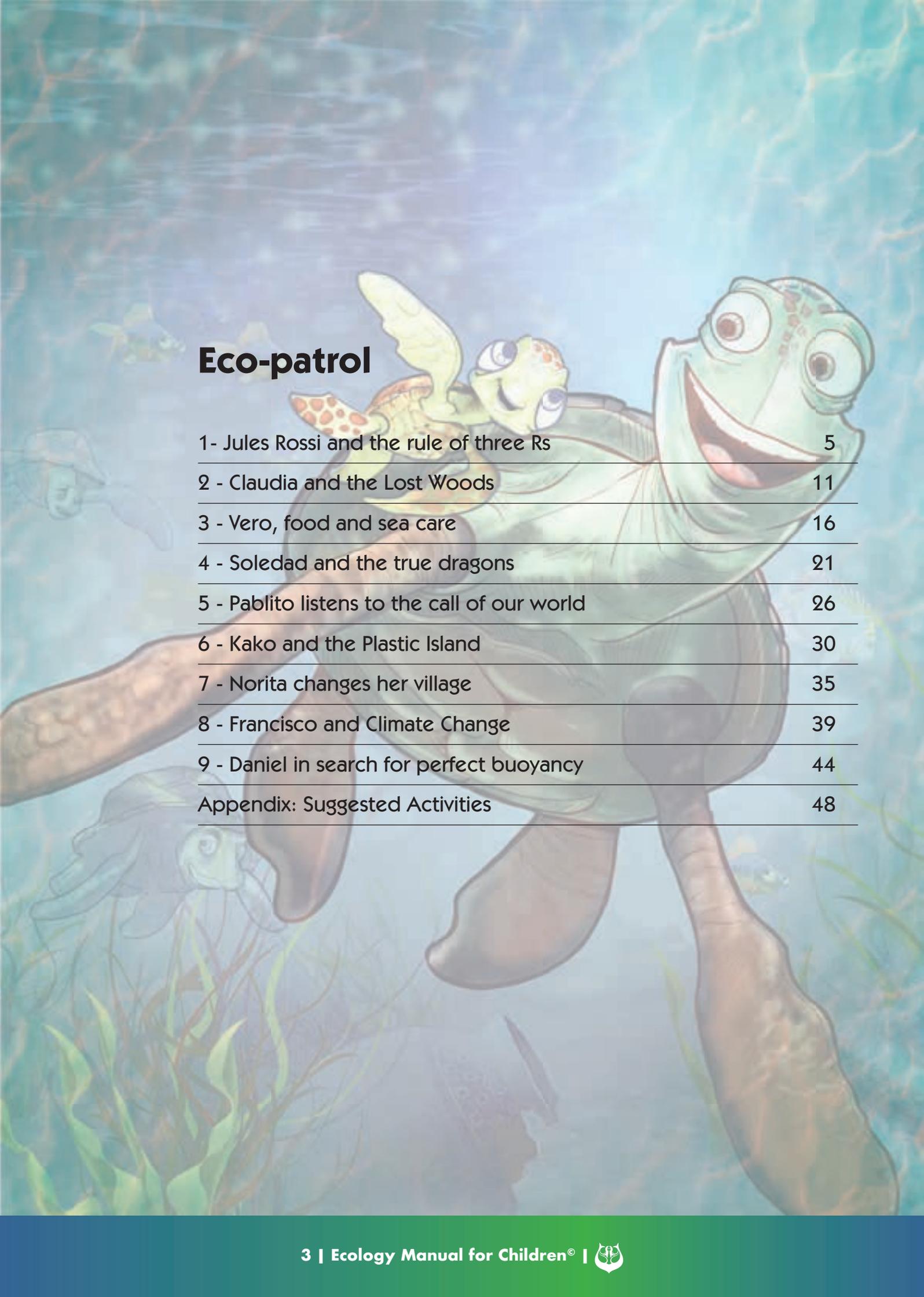
WORLD CONFEDERATION OF
UNDERWATER ACTIVITIES



CMAS

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UNDERWATER ACTIVITIES**

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Eco-patrol

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Eco Patrol

ANNEX FOR CHILDREN

Chapter #1

Jules Rossi and the rule of three Rs



JULES ROSSI



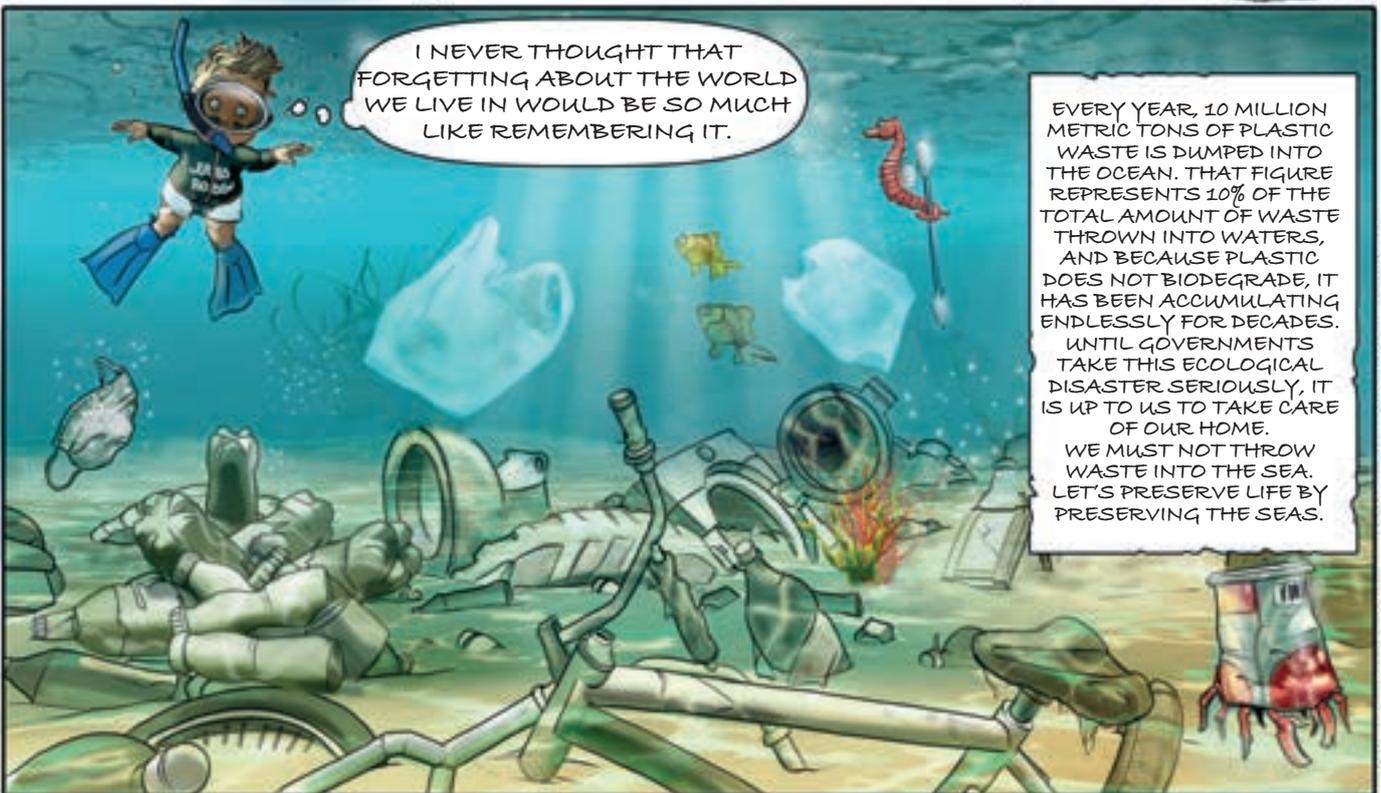
"PUT ON THE SUIT AND FORGET ABOUT THE WORLD YOU LIVE IN", SAID THE FLYER I GOT AT THE DIVE SCHOOL.



HERE I GO, MAGICAL WORLD OF THE DEEP SEAS!



WOW!



I NEVER THOUGHT THAT FORGETTING ABOUT THE WORLD WE LIVE IN WOULD BE SO MUCH LIKE REMEMBERING IT.

EVERY YEAR, 10 MILLION METRIC TONS OF PLASTIC WASTE IS DUMPED INTO THE OCEAN. THAT FIGURE REPRESENTS 10% OF THE TOTAL AMOUNT OF WASTE THROWN INTO WATERS, AND BECAUSE PLASTIC DOES NOT BIODEGRADE, IT HAS BEEN ACCUMULATING ENDLESSLY FOR DECADES. UNTIL GOVERNMENTS TAKE THIS ECOLOGICAL DISASTER SERIOUSLY, IT IS UP TO US TO TAKE CARE OF OUR HOME. WE MUST NOT THROW WASTE INTO THE SEA. LET'S PRESERVE LIFE BY PRESERVING THE SEAS.



CHAPTER #1

Most likely, like Jules Rossi, you went out to sea with the idea of getting away from the “artificial world” in which we live and enjoy the “natural world” that, almost always, feels very far away. But, as it also happens to Jules, as soon as you start your journey, you discover that these two “worlds” are not separated, but part of a single one: our planet, Earth.

And the Earth has serious problems; problems that we cause and that we can also solve. We rarely stop to think about it, but many of the things, comforts and services we enjoy every day exist thanks to the resources we take from nature and, at the same time, produce waste that, as it is often badly disposed of, damages nature itself. The worst thing is that this happens all over the planet.

It is true that a large amount of waste is biodegradable (i.e. it can degrade and thus return to the circuit of nature without damaging it), but it is also true that we generate it at such a speed and in such quantity that the ecosystems are unable to self-recover. And this is not the worst thing.

An almost infinite amount of waste is not biodegradable or takes decades, even centuries, to degrade; it could be said that it is almost “indestructible”. If you look around, wherever you are, you will surely find some of the most abundant type of “indestructible” waste: plastics. But of course, they are not the only ones.

When you become aware of this danger, you may ask yourself: What can be done to avoid this? Is anyone doing it?

The problem is very big and there is a lot to do. The solution is not the responsibility of a single person, a single organization or a single country. The solution can only be found in community and many of us are trying to do it right now.

Now, if you want to be part of the solution, the first step is to ask yourself: What can I do? And the truth is that everyone, regardless of where they are in or their age, can do a lot. How? Well, one of the simplest ways is to apply the “rule of the three Rs” in your daily life:

✓ **R**educe.

✓ **R**euse.

✓ **R**ecycle.

Reduce the amount of waste, **R**euse everything that can have a second use - especially plastic bags and containers - and **R**ecycle any recoverable material to obtain raw materials from it, but without harming nature. These three **Rs** are actions that anyone can do and that significantly benefit the environment. The bad thing is that, despite being very simple actions, relatively few people take them into account.



CHAPTER #1

Reduce and Reuse

These are the simplest actions. You will simply have to pay attention to certain “details” in your daily life that we usually overlook. Here are a few ideas:

- When you go shopping, take your own bags or a cart; in this way you can Reduce the use of disposable plastic bags.
- Be careful when choosing the products you want to buy by taking into account whether the containers can be Reused or not.
- Buy drinks in returnable bottles, preferably glass, since they can be Reused.
- Pay attention to the packaging and see if what you are going to buy has too many wrappers. For example: have you noticed that several brands sell cookies wrapped in cellophane, arranged on a tray and then in an envelope or bag? Well, all that plastic is thrown away. That’s why it’s always better to choose the simplest possible packaging in order to Reduce waste.
- We almost always forget that sheets of paper have two sides. Using both sides of pages in notebooks and sketchpads, or making all our photocopies double-sided, helps to significantly Reduce paper consumption.
- In many cases, it is a good idea to use boards to study or draw, and thus Reduce paper consumption.
- Much of the paper can be Reused. There are workshops that teach you how to Recycle paper and use it for decoration, bookbinding, etc.
- If you have to take food to eat away from home, it is always preferable to use containers that can be Reused, and avoid plastic bags or disposable Styrofoam boxes.

Recycling

Reducing and Reusing are activities that we can almost always do by ourselves, but Recycling requires a collaborative effort of many people. Recycling is a process with many steps, but the first one can be taken at home, where we can begin the cycle by carrying out one of the most important tasks: separating waste according to its type. This separation is essential so that the different materials do not contaminate each other and can be reused. For this purpose, it is highly recommended to use containers of different colors.

- **Green:** for glass containers
- **Yellow:** for plastic containers and cans
- **Blue:** for paper and cardboard

These colors are not randomly chosen, but correspond to the ones used in the Clean Points.



CHAPTER #1

What is a Clean Point? They are containers identified by color placed by local authorities so that, apart from throwing our separated waste, we can dispose of hazardous or highly polluting waste, such as batteries, oil, household appliances or debris, for example.

Another detail to bear in mind for proper Recycling is that, during the separation of our waste, it is essential to remove other substances and elements. Each material has a different type of preparation, but we will see that none of them is difficult; you just have to pay attention and follow some very simple steps.

TO RECYCLE FABRICS

- If you have clothes in good condition and you want to donate them, always hand them in clean, sewn and ironed.
- Scraps of fabric (that can be used as “rags”), regardless of their size, should be clean and dry.
- Never forget to remove buttons, zippers and other embellishments from fabric scraps.
- It is very important to separate synthetic fibers (nylon, polyester and waterproof) from the rest of the fabrics.

TO RECYCLE PLASTICS

- All plastic parts must be clean and dry (inside and outside). It is very important that they do not have food scraps, oil or other substances.
- It does not matter if the plastic pieces are broken or not, but it is convenient to separate the “soft” ones (bags and wrappings) from the “hard” ones (bottles, containers, toys).
- Crush bottles, jars and other containers.
- When plastic is hard, make sure it has no sharp edges or spikes that could be dangerous to recyclers.
- When possible, separate plastics into categories by using these symbols to guide you when you find them printed on the garbage cans:



TO RECYCLE GLASS

- The first thing to keep in mind is that some glass bottles and jars are “returnable”, that is, they can be taken back to stores to be used again.



CHAPTER #1

- Glass must always be completely dry and clean, inside and outside in the case of containers.
- Do not forget to remove non-glass components such as threads, washers, labels or caps.
- It is advisable to classify the glass according to its color: green, amber or transparent.
- VERY IMPORTANT: broken glass is dangerous. It should always be disposed of in cardboard boxes or wrapped in paper and well labeled to avoid accidents to recyclers.

TO RECYCLE PAPER AND CARDBOARD

- In order to be Recycled, paper and cardboard must be completely dry and free of oil or grease.
- Separate the paper according to its type: newspaper, magazine, office, computer or cardboard.
- Pack paper and cardboard separately.
- Do not tear or crumple the paper. It is better to fold it.
- Do not put it inside plastic bags. It is always better to tie it up with packing twine.
- Keep in mind that carbon paper and cellophane should not be mixed with paper and cardboard.

TO RECYCLE METAL

- It is always best to separate metals according to their type: copper, aluminum, steel, iron, etc.
- Do not forget to separate everything that is not metallic, such as: paper labels or plastic elements.
- Aluminum and steel cans should be compressed, if possible. Keep in mind that approximately 60 cans are needed to obtain 1 kg of recycled aluminum.
- In the particular case of aluminum, it is convenient to separate the recyclable material (identified with the symbol ) from the non-recyclable material.
- It is very important that you try to eliminate sharp edges and spikes that could be dangerous to recyclers.

Once you get into the habit of following the rule of the three Rs, you will be amazed at how much you can contribute to taking care of our planet.

The next step will be to spread the word about your **Reduce, Reuse** and **Recycle** experiences among your family and friends. Little by little, together, we will be able to heal the wounds we have inflicted on our planet.

Chapter #2

Claudia and the Lost Woods



CLAUDIA



I'M SURE IT'S THIS WAY. THERE WAS A TREE ON WHICH I WROTE MY NAME AND YOUR MOM'S NAME WHEN WE HAD OUR FIRST KISS.



AND OVER HERE THERE WAS A TREE ON WHICH MY DAD ...

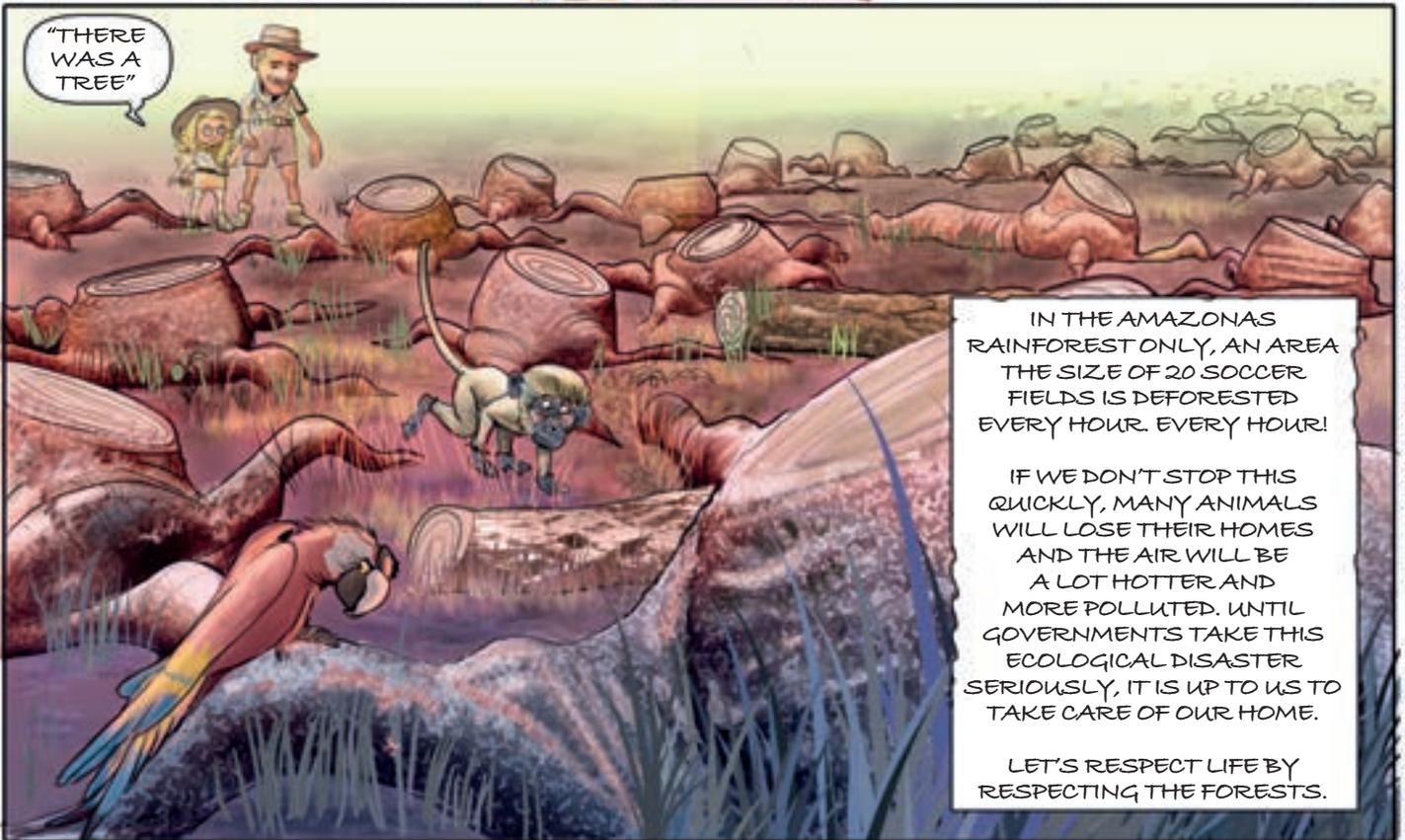
HUNG THE SWING AND WE SPENT THE WHOLE DAY PLAYING.



AND...



...YOU WERE RIGHT DADDY....



"THERE WAS A TREE"

IN THE AMAZONAS RAINFOREST ONLY, AN AREA THE SIZE OF 20 SOCCER FIELDS IS DEFORESTED EVERY HOUR. EVERY HOUR!

IF WE DON'T STOP THIS QUICKLY, MANY ANIMALS WILL LOSE THEIR HOMES AND THE AIR WILL BE A LOT HOTTER AND MORE POLLUTED. UNTIL GOVERNMENTS TAKE THIS ECOLOGICAL DISASTER SERIOUSLY, IT IS UP TO US TO TAKE CARE OF OUR HOME.

LET'S RESPECT LIFE BY RESPECTING THE FORESTS.



CHAPTER #2

Like Claudia and her father, it can happen that we associate some treasured memories with a tree: the shade of a summer, those fruits eaten under its branches, an improvised swing in the garden or the names of two lovers engraved on the bark. And it can also happen that, for many reasons, that tree has been lost. But what if it is not just one? but two, three or more than ten?

Claudia and her dad started talking about losing trees and discovered that they were talking about losing forests, and losing a forest is losing an ecosystem and everything that depends on it: the plants, the animals, the insects, the sustenance of entire populations, the climate and the air we breathe. Unfortunately, it is not only a forest that is being lost today. The consequences of indiscriminate logging and deforestation are being suffered all over the planet.

What are indiscriminate logging and deforestation?

Before answering this question, we need to know what **logging** is.

Logging is the process of cutting down trees that serve as raw material for human activities such as construction, furniture and tool making, cooking, or heating homes. Logging itself is an activity that humans have been doing since prehistoric times. If trees are cut down respecting the pace of natural regeneration, i.e. in such volume and periods of time that allows trees to grow back, there is no reason why the planet should be harmed.

Indiscriminate logging, on the other hand, does damage the planet a lot. It occurs when trees are cut down in such a quantity and at such a high rate that nature cannot regenerate the affected forest or jungle. The number of trees and vegetation in general diminishes, to the point of causing deforestation, that is, the total extinction of the plant species in the area where the **indiscriminate logging** is carried out. Without food and shelter, the animals and insects of the affected ecosystem migrate or die.

Deforestation is a serious problem for the health of the planet. It is a widespread practice on a global scale, which has led to the loss of more than eleven million hectares of forest per year between 2010 and 2020, which is equivalent to losing more forest area each year than the province of Catamarca in Argentina or the Republic of Iceland.

Generally, **indiscriminate logging** is usually carried out for economic reasons, such as:

- To extend cultivation areas.
- To replace existing tree species with some type of commercially valuable ones.
- To exploit wood.
- To breed livestock.
- To use the land for construction.



CHAPTER #2

What are the consequences of indiscriminate logging and deforestation?

First of all, let's remember why forests are called "the lungs of the planet". When breathing, all animal species (yes, including humans) take in air from the atmosphere, from which we obtain the necessary oxygen (O₂) to live, and release carbon dioxide (CO₂). Plants perform the reverse process: they take in carbon dioxide and release oxygen. This is how trees and plants renew the air with their supply of oxygen. In view of this, we can say that the first and most immediate consequence of **indiscriminate logging** and **deforestation** is the loss of the quality of the air we breathe.

Unfortunately, the loss of air quality is not the only consequence.

The different types of forests and jungles in the world are the refuge for the biodiversity of each place, so the disappearance of a large part, or all, of those trees in a forest or jungle endangers this biodiversity, causing or accelerating the extinction of the many species that inhabit them or depend on them to live.

And it is not only the flora and fauna that suffer. The people who live in the area of forests and jungles suffer every day from the destruction of the natural resources that provide them with food and resources to live. Destroying forests or jungles for agricultural, livestock or timber exploitation often results in soil erosion (which makes the soil infertile), wild fires and floods. The deforestation of the Amazon is a well-known example of these problems but unfortunately, not the only one.

The curious thing is that what usually begins as moderate logging, from which valuable resources are obtained, ends up being **indiscriminate logging** that causes **deforestation** and turns the benefits into serious problems of contamination, soil loss, loss of biodiversity and, in the long run, destruction of the very natural resources that were intended to be obtained.

And what can WE do?

It is true that indiscriminate logging is a global problem and that a definite solution can only be achieved with the cooperation of all countries. There are several international organizations, such as the Forest Stewardship Council (FSC), which establish rules so that we can take advantage of forest resources without destroying them. If a wood or paper product has the FSC seal, we know that it was produced in a sustainable way and without destroying forests or jungles.

It is also true that we can be part of the solution by doing our bit. Any small action helps and sets an example; and if we join forces, we can make a significant change.



CHAPTER #2

If we want to help prevent **indiscriminate logging** and **deforestation**, some possible actions are:

- Planting native trees.
- Not using paper or at least reducing paper consumption (using digital documentation, for example).
- Recycling and buying recycled products.
- Buying organic products.
- Avoiding the consumption of products that come from indiscriminate logging (e.g. palm oil).
- Choosing wood or paper products with the FSC seal.
- Joining organizations that fight for the conservation of nature and forests.
- Participating in organizations that encourage, promote and carry out sowing or planting of trees to recover deforested areas.

These are a few examples. There are many more. If you commit yourself to it, investigate and participate, we can all together give hope and a future to the forests and to ourselves.

Chapter #3

Vero, food and sea care



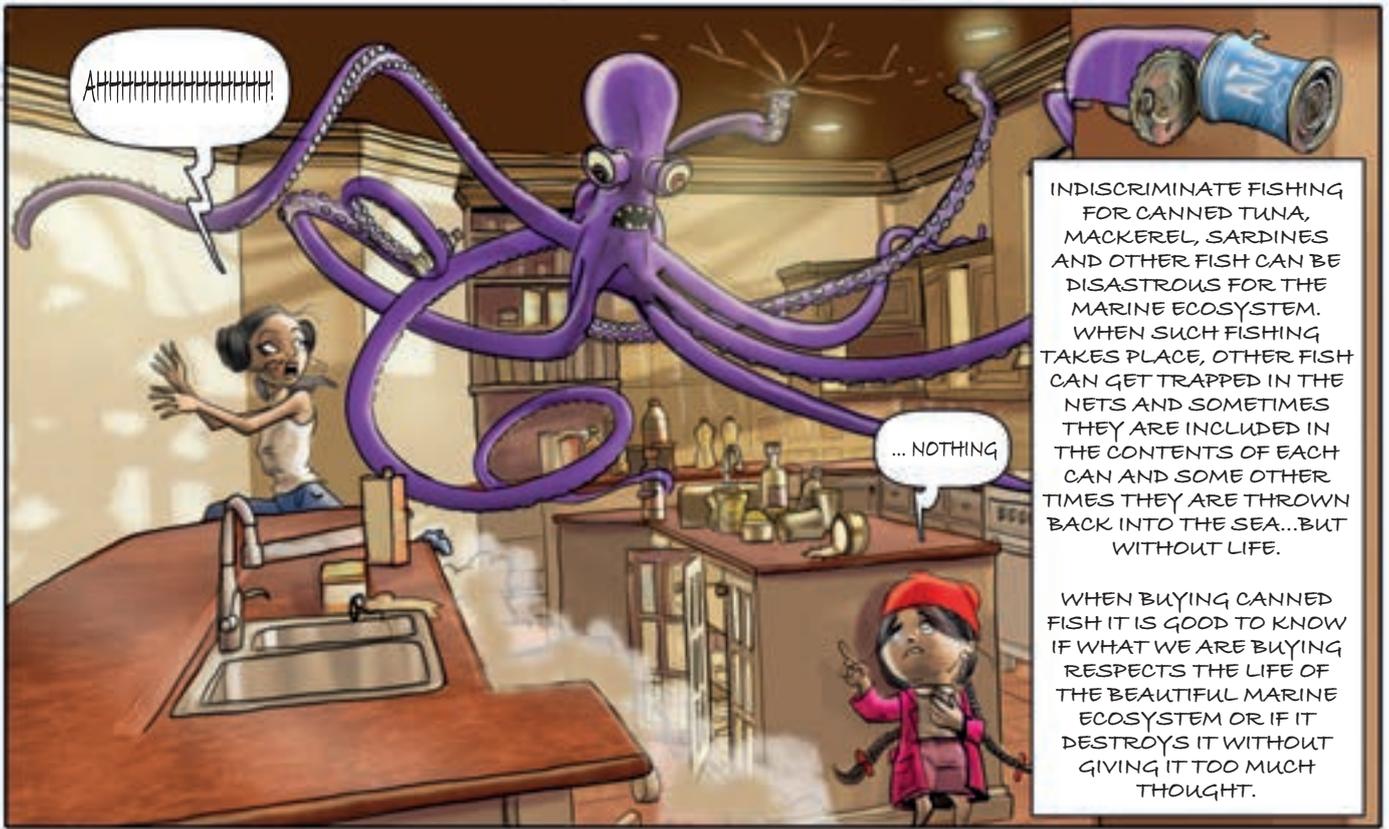
MOM... AREN'T YOU GOING TO CHECK WHAT KIND OF CANNED FOOD YOU BUY?
I HAVE BEEN TOLD THAT SOMETIMES WHEN YOU BUY TUNA OR MACKEREL OR ANY OF THOSE...
YOU CAN ALSO BE BUYING OTHER THINGS THAT THEY PUT IN THE CAN WITHOUT ANY KIND OF CONTROL.



OTHER THINGS, LIKE WHAT?
OTHER THINGS LIKE DOLPHINS, OR...
AH, VERO... VERO... YOU ALWAYS BELIEVE EVERYTHING PEOPLE SAY.
IF THE LABEL SAYS TUNA, IN THE CAN THERE IS TUNA.



WMMMMMM.....
MOMMYYYY!!!!
"WHAT IS IT, SWEETIE?"



AHHHHHHHHHHHHH!!!
... NOTHING

INDISCRIMINATE FISHING FOR CANNED TUNA, MACKEREL, SARDINES AND OTHER FISH CAN BE DISASTROUS FOR THE MARINE ECOSYSTEM. WHEN SUCH FISHING TAKES PLACE, OTHER FISH CAN GET TRAPPED IN THE NETS AND SOMETIMES THEY ARE INCLUDED IN THE CONTENTS OF EACH CAN AND SOME OTHER TIMES THEY ARE THROWN BACK INTO THE SEA...BUT WITHOUT LIFE.

WHEN BUYING CANNED FISH IT IS GOOD TO KNOW IF WHAT WE ARE BUYING RESPECTS THE LIFE OF THE BEAUTIFUL MARINE ECOSYSTEM OR IF IT DESTROYS IT WITHOUT GIVING IT TOO MUCH THOUGHT.



CHAPTER #3

Have you ever asked yourself what happens from the moment food is taken from nature until it is on your plate? In a humorous way, the story of Vero and her mom shows us how we usually eat our food without asking too many questions about its origin or the environmental damage its production generates, especially with seafood.

Seafood products are essential for feeding countless of big and small communities all over the planet, but they are not always obtained in a way that protects the environment. In this regard, one of the biggest problems fisheries face is **by-catch**.

What is by-catch?

By-catch occurs when, while fishing for a particular species (tuna, cod, sardines, etc.), fish, shellfish or any other marine species that are not the target of the fishery are caught unintentionally, carelessly or accidentally. The species that are victims of **by-catch** usually have no commercial value and, in the worst-case scenario, may be protected or endangered species.

It is also the case that **by-catch** “contaminates” seafood production. When Vero warns her mother about the possibility of tuna cans containing dolphin remains, she is not exaggerating. During 2020, researchers from the National Autonomous University of Mexico (UNAM by its acronym in Spanish) discovered that several brands of canned tuna in Mexico were contaminated with dolphin meat. Although they found no health risk to humans, the misleading labeling and the damage to a species at risk of extinction were revealed.

Unfortunately, **by-catch** is not the only ecological problem of the fishing activity. There is also **overfishing**, i.e., fishing in greater quantities and faster than the ecosystem can naturally replenish. Both practices are a threat to the environment and to our food security.

You are probably asking yourself, as we all do: if we must feed ourselves and at the same time take care of the sea, how can we protect the marine environment and its endangered species without endangering the food supply of more than half of humanity? The answer to this question is **sustainable fishing**.

What is sustainable fishing?

Sustainable fishing is the one which is carried out taking into account the problems mentioned above.

A fishing activity is **sustainable** when:

- The amount of fish caught is limited so that its population can reproduce adequately, renewing itself continuously.



CHAPTER #3

- The fishing methods used reduce, as much as possible, the capture of specimens that **are not** the objective of the fishing activity.
- The system enables unintentional catches to be returned to the sea or, when this is not possible, to take advantage of their food value.

Sustainable fishing ensures that the ecosystem remains healthy and productive.

There are several international organizations which certify that a seafood product comes from a sustainable fishing activity. As an example, we can mention:

- Marine Stewardship Council (MSC)
- Friend of the Sea

When a seafood product comes from sustainable fishing, these organizations award one of these seals:



When buying seafood products, it is important to look for these seals on the packaging labels; so that we can be sure that we are consuming products from fishing companies that contribute to the conservation of the environment.

What else can we do?

In order to preserve the marine environment, it is not enough that fishing companies carry out good practices and certify sustainable fishing methods. It is our responsibility, both individually and as a community, to take care of marine species and keep beaches, seas and oceans clean.

There are actions that may seem small, but which, done as a community, can make a very important difference when it comes to protecting the planet.

Here are a few ideas:

- If you are a sport fisherperson, respect the closed seasons of each region and the size and weight of the fish that can be caught. These restrictions are meant to protect the fish reproduction seasons and to favor the recovery of the ecosystem.



CHAPTER #3

- While on vacation, do not buy objects made from parts of turtles, sharks, whales or any type of marine species. This is a way to promote the protection of marine species and their habitats.
- Be very careful with plastic. Every year, thousands of marine animals die, directly or indirectly, due to the excess of plastic, which ends up in the seabed. Reuse water bottles, use cloth bags for shopping, recycle containers, etc.
- Keep the beach clean. Be careful not to throw your own trash, but also pick up any waste (food scraps, cigarette butts, cans, etc.) that you might find when you arrive.
- Be careful with aquatic pets. Never introduce marine species bred in aquariums into the sea as you may facilitate the invasion of alien species that can harm the ecosystem.
- Travel and visit marine sites responsibly and respectfully. The sea is not a garbage can, so we should always carry containers for our garbage, and then, on land, throw it away in the appropriate containers.
- Do not throw cigarette butts into the street. They contain many chemical elements that are strong water pollutants and can also be ingested by marine animals. Strangely enough, many of them end up in rivers and seas.

As we have said before, these are a few examples. There are many more. If you commit yourself to it, investigate and participate, we can all together protect marine species and guarantee our food security.

Al comprar productos del mar, es importante buscar en las etiquetas de los envases estos sellos; así podremos asegurarnos de consumir productos de empresas pesqueras que contribuyen a la conservación del medioambiente.

Chapter #4

Soledad and the true dragons



DADDY...WHY AREN'T THERE ANY MORE DRAGONS IN THE WORLD?

WELL...



BECAUSE DRAGONS FOULED THE SEAS AND THE AIR WITH THE GAS FROM THEIR MOUTHS AND THE SCALES ON THEIR BODIES, AND THEY WERE A REAL DANGER! CAN YOU IMAGINE SUCH A BEAST UNLEASHING ITS FIRES IN OUR FORESTS? NO ONE COULD STOP THEM!

THAT'S WHY MEN CONFRONTED DRAGONS... AND WON THE BATTLE!



WILD FIRES



POOR LITTLE DRAGONS IF THEY COULD SEE WHAT WE HAVE DONE TO THE PLANET....

...I'M GOING TO KEEP READING, DADDY. THE WORLD IN MY BOOKS IS MUCH LESS PAINFUL THAN THE ONE ON TV.

A FOREST THAT BURNS DOWN IS AN ECOSYSTEM THAT WE LOSE FOREVER. NATIVE TREES AND PLANTS, ANIMALS, INSECTS AND EVEN HUMANS SUFFER YEAR AFTER YEAR THE CONSEQUENCES OF INDISCRIMINATE BURNING. IN ADDITION, AS 95% OF WILD FIRES ARE CAUSED BY MAN, THEY ARE TOTALLY AVOIDABLE. SO, WE ONLY HAVE ONE QUESTION TO ANSWER: WHEN WILL WE PUT AN END TO THESE DEVASTATING PRACTICES FOR THE PLANET WHICH WE ALL LIVE IN?



CHAPTER #4

The Dragons in the stories that Soledad enjoys so much are big, strong and often dangerous. Dangerous for the knights-errant, the lost ladies and the peasants who fear for their lands, but not necessarily for the magical world they inhabit. There, they are part of a “natural” balance and when this balance is broken, there is always a hero to restore it. Conversely, the “dragons” his father speaks of are very different; especially because they do not live in a fantasy world but in our real world and, although they do not have enormous wings, sharp teeth or spiky tails, they have enough fire to endanger jungles, forests and pastures, their inhabitants, all those who enjoy them or live off them and especially the general balance of the planet we inhabit. To fight these “dragons”, individual heroes are of no use, because the responsibility for their fires lies on everyone: states, companies, communities and citizens are the ones who must take care of our world from the destructive fire.

It is worth repeating that forests, jungles and grasslands fulfill extremely important functions in the dynamics of the environment: they are home to an enormous variety of plants, animals and insects, providing them with food, water and shelter; they provide the oxygen that we all breathe; they regulate the temperature of the planet, making it habitable; they fix the soil, preventing floods, among many others. They also provide communities with fundamental resources such as food, medicines, raw materials and energy; they are also places where humans can experience nature. Who doesn't enjoy walking in the woods?

Wildfires

In chapter two, together with Claudia and her dad, we saw that forests and jungles are threatened by indiscriminate **logging** and **deforestation**. To these serious threats we have to add **wildfires**, which destroy thousands of hectares every year.

We talk about a **wildfire** when fire spreads uncontrollably through wild land (forest, jungle, pasture), consuming the available plant fuel and destroying flora and fauna. A **wildfire**, unlike other types of fires, covers a very large area of land, spreads at great speed from its place of origin, can change direction unexpectedly and has a great capacity to overcome obstacles such as roads and rivers. This is why they are so destructive.

Can forests, jungles and grasslands recover from wildfires?

Unfortunately, not in all cases, but many times they can. Each burned area will have a recovery time that will depend on many factors (climate, total area affected, reproductive capacity of the species, care and commitment of the communities, etc.). The problem is that, especially in the case of forests and jungles, the recovery time can take several decades. On average, a forest takes between 70 and 100 years just to grow, but fire can destroy it in just a few hours. In most cases, even if the forest can recover as such, old trees (hundreds or thousands of years old) or endangered animal species will be lost forever.



How does a wildfire start? (No, dragons have nothing to do with it.)

It may happen that a fire starts due to natural causes. One of the most common is a lightning strike during a storm in an area affected by drought.

Unfortunately, in most cases, the origin of the fire lies in the actions of human beings. Even if we find it hard to believe, people or companies that “clean” the soil in order to extend cultivation and cattle-raising areas or to carry out real estate businesses, often start fires intentionally. It is also common for fires to start because of carelessness or negligence of people who set campfires in forbidden places or throw cigarettes that have not been properly put out.

Whether its origin is intentional, accidental or negligent, a wildfire always causes the destruction of an entire ecosystem and all its resources, in addition to endangering people, homes and entire populations.

And what can WE do?

To prevent **wildfires** we must all do our part. It is always important to be attentive, and if we detect a fire outbreak or know of the possibility of someone starting one, to immediately inform the authorities (firefighters, police, civil defense, etc.), but much more important is to be responsible in the management of our own fires, especially when we are working or enjoying a natural area.

We should always keep these guidelines in mind:

- It is our **responsibility** to prevent a fire.
- We mustn't throw matches or cigarette butts (even if they are out).
- We mustn't throw cans or glass. Apart from littering the landscape, they favor fires when in contact with the sun.
- We should **never** play with matches or lighters.
- We mustn't light fires in places that are not authorized for it.
- We should **always** keep an eye on campfires.
- We must **always** make sure that the fire is completely extinguished before leaving it.

When we are outdoors and we need to make a fire, regardless of whether it is for cooking or heating, we must always follow the following rules:



CHAPTER #4

- Make sure to light the campfire in a permitted place (“No fire” signs must not be ignored).
- Make sure there is not too much wind.
- Dig a small hole away from hanging branches.
- Enclose the hole with stones.
- Create a caution area: clear a 10-foot area around the hole, removing any vegetation that could ignite.
- If additional firewood needs to be stockpiled, place it upwind and away from the fire.
- After lighting the fire, the match should be thrown into the fire.
- Never leave a campfire unattended; an adult should supervise it at all times.
- Have a bucket of water and a shovel nearby.
- Never place anything other than wood in the campfire.
- Do not remove burning logs from the fire.
- Do not sit in the caution area or on the stones around the campfire: they heat up quickly and remain hot for a long time.
- When it is time to put out the fire, pour a lot of water over it, stir with a shovel and then pour more water. Make sure the remains are cool before leaving camp. **If it’s too hot to touch, it’s too soon to leave!**
- And remember that children should **never** play with matches, lighters or flammable liquids. If you find any of these items, tell an adult to handle them.

It is true that many humans, intentionally or unintentionally, have become “dragons”, but it is also true that some of us have become “guardians” of the forest. There is a lot for all of us to do. On the next page, Soledad suggests six simple steps to keep dragons in fairy tales.

Chapter #5

Pablito listens to the call of our world



PABLITO



LOOK PABLITO! A SEASHELL!



WHEN I WAS A KID, EVERY TIME WE FOUND A SEASHELL ON THE SAND WE WOULD HOLD IT CLOSE TO OUR EAR AND LISTEN TO THE SEA'S SECRETS, STORIES OF MERMAIDS, OF PIRATES... OF FANTASTIC SEA MONSTERS!



WHY DON'T YOU TRY TO SEE WHAT KIND OF STORIES THE SEA TELLS YOU TODAY?

THE NUMBER YOU ARE TRYING TO CALL IS DISCONNECTED OR OUT OF COVERAGE AREA.



WHY BOTHER, DADDY?

AFTER EVERYTHING WE'VE DONE TO IT, THE SEA MUST HAVE BLOCKED US IN HIS CONTACT LIST.



GLOBAL WARMING IS AFFECTING EVERY CORNER OF THE EARTH..... EVEN THE OCEAN DEPTHS IF THIS PHENOMENON (PRODUCED BY INDISCRIMINATE LOGGING AND UNCONTROLLED INDUSTRIALIZATION) IS NOT STOPPED SOON. IN A FEW YEARS, THE MOST IMPORTANT CORAL REEFS IN THE WORLD WILL DISAPPEAR BECAUSE THE INCREASINGLY WARM WATER IS BLEACHING THEM. WITHOUT CORAL REEFS, A RICH ECOSYSTEM WILL DISAPPEAR FROM OUR OCEANS. IT IS UP TO GOVERNMENTS AND INDUSTRIALISTS TO MAKE THIS STOP AND UP TO US TO LET THEM KNOW THAT THIS IS AN ISSUE THAT CONCERNS US ALL AS INHABITANTS OF THIS PLANET.



Until not so long ago, listening to the sea, as Pablito's dad did, was to immerse oneself in the tranquility of a sunrise, in the strength of the waves or in the legends that the salt water mixed with imagination told us. But for today's children and young people, if they are as attentive to what is happening in their world, as Pablito is, the sea tells not only about beauty but also about problems and dangers: coral reefs that disappear, species that become extinct, water levels that rise or seas and lakes that gradually get warmer or dry up. These environmental phenomena are, for those who want to listen, like words; words that form a "message" for the younger generations, a message that translated tells us: **we have to stop Global Warming.**

Global Warming

Global Warming is the increase in the average temperature of the entire planet Earth. It is not a new phenomenon in the history of our world and some of its causes are natural, such as changes in volcanic activity or in the sun's energy emissions, but in recent centuries, due to **greenhouse gas emissions** produced by **human activities** (mega cities, industries, livestock farming, deforestation, etc.), it has been accelerated. This rise in average temperatures has catastrophic consequences, such as increased droughts or the melting of glaciers (just to mention two).

Stopping **Global Warming** is a collective responsibility: governments, institutions, companies, communities and individuals can and should, each one according to their possibilities and degree of responsibility, make their contribution to stop the increase in the planet's temperature.

How can children and teenagers fight Global Warming?

Until recently, ecological problems in general, and Global Warming in particular, seemed to be the exclusive responsibility of adults, but in recent years children and young people have become more and more important in this struggle, since it will be them the ones who will suffer the consequences and at the same time who will be responsible for taking care and healing the planet in the very near future.

Children and teenagers can participate in both collective and individual actions to stop **Global Warming**. You are probably asking yourself: how can I help? The truth is that there are countless ways to participate, some of them may be:

- **Educate yourself:** read, research, ask questions and learn as much as possible about respect for nature. Both for your own knowledge and to educate others about this serious problem we all face.
- **Participate and demand action:** Do not hesitate to be part of the groups, movements and institutions that claim to governments and companies the long-term sustainable management of natural resources.



CHAPTER #5

- **Reduce water consumption:** Avoid unnecessary water use: keep the shower running only as long as necessary, do not leave the faucet running while brushing your teeth, shaving or drying the dishes, etc.
- **Protect waters:** Never throw any kind of garbage into the sea, rivers or lakes; and take part in protests and campaigns to stop water pollution.
- **Moderate the use of vehicles:** whenever possible, choose to travel by public transport; if the journey is short, opt for a bicycle; use private vehicles moderately and, above all, efficiently: do not leave the engine running when you stop and do not accelerate too fast. And when you have to buy a vehicle, if possible, choose models with electric or hybrid engines or those that certify low gas emissions.
- **Reduce paper consumption:** make photocopies or print only the pages that are strictly necessary and always double-sided; reuse diaries, notebooks and notepads that still contain blank pages; choose, whenever possible, products made from recycled paper.
- **Plant trees:** the more trees, the better: a single hectare (2.47 acres) of trees eliminates, in a year, the same amount of carbon dioxide that 4 families produce in the same period.
- **Recycle our waste:** by separating the different elements of the garbage: aluminum, paper, glass, plastics and organic matter, we enable the reutilization of a large part of them. A very simple action, but one that implies saving energy and protecting the environment.
- **Save energy:** we can save a lot of energy just by paying attention to how we use our electronic devices, for example: avoid overusing or leaving irons, water heaters or washing machines plugged in when not in use; completely turn off the computer, game console or TV after using them (stand-by mode also consumes energy); use only energy-saving or LED lamps and reduce the consumption of air conditioning by adjusting it to moderate temperatures.
- **Eat in a sustainable way:** it is as simple as reducing the consumption of food from livestock farming and increasing the consumption of fruits, vegetables and seasonal vegetables and, preferably, produced in nearby places; do not consume food made from exotic animals such as turtles or iguanas and eat fish only if it comes from sustainable fishing.
- **Reduce the consumption of chemicals:** Minimize the use of chemical compounds such as aerosols, detergents, insecticides and fertilizers.

As we said before, these are just some of the ways in which we can contribute to stop **Global Warming**. There are many more. If we pay attention to what nature is telling us, as Pablito does, each of us will surely discover the most appropriate way to help stop it.

Chapter #6

Kako and the Plastic Island



EKO



DAD! MOM!
WE'RE
GETTING
CLOSE TO

SOMETHING
HUGE!

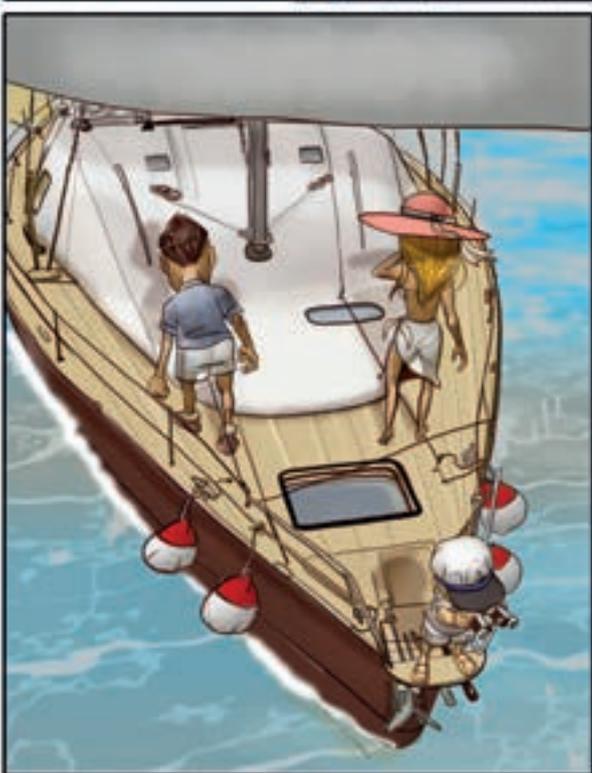


REALLY? THE
NAVIGATION MAPS
DON'T SHOW ANY
ISLANDS IN THIS
AREA.

MAYBE IT'S AN ATOLL
THAT NO ONE HAS
DISCOVERED YET....
FULL OF HIDDEN
TREASURES!



OR
MAYBE...



I'D BETTER
NOT TELL YOU
WHAT'S COMING

NOW. IT WOULD BE A
MAJOR BLOW TO YOUR
CHILDISH FANTASIES.

OCEANS ARE NOT WHAT THEY USED TO BE. HUGE GARBAGE ISLANDS FULL OF PLASTICS AND OTHER HARMFUL ELEMENTS TO THE ECOSYSTEMS ROAM AROUND WITHOUT MAN DOING ANYTHING TO REDUCE THEM. IN THE NORTH PACIFIC THERE IS AN AREA CALLED GARBAGE PATCH, WHOSE SURFACE AREA IS ESTIMATED AT 31 MILLION KM² (SEVEN TIMES THE SIZE OF SPAIN) AND CONTAINS ABOUT 100 MILLION TONS OF WASTE. BECAUSE GARBAGE DOES NOT JUST DISAPPEAR WHEN WE THROW IT AWAY... THAT IS THE BEGINNING OF A PROCESS WE MUST DO OUR BEST TO STOP.



CHAPTER #6

Sailing the sea always holds the promise of adventure. Facing the waves and trying to master the winds awakens, in children and adults alike, the illusion of encountering an endless variety of marine life or “discovering” distant, beautiful and mysterious islands. Surely, these were the greatest expectations of Kako’s parents in their childhood, but for Kako and all the children and teenagers of his generation who go sailing, there is another possibility of “discovery” that is not happy at all: the **Plastic Islands**.

What are plastic islands?

Plastic Islands are huge accumulations of waste, mostly microplastics (smaller than five millimeters in size), which are not biodegradable and which, as a result of ocean currents, have been grouped together to become immense floating masses of garbage. They are so huge that, at first sight, as it happens to Kako and his parents, they can be mistaken for real islands, but just by getting a little closer, they show us the serious damage we are causing to our planet.

Why are plastic islands formed?

Absolutely all the causes of these giant accumulations of garbage in the sea are man-made. Just to mention a few examples:

- Inadequate or non-existent waste recycling.
- Illegal dumping of waste.
- The pollution of rivers that inevitably flows into seas and oceans.
- Waste accumulated on beaches, coasts and docks, which is carried into the sea by tides and winds.

It is true that a large part of these problems are the responsibility of companies, institutions and states, but it is no less true that “ordinary people” also have a huge share of responsibility, especially when it comes to our daily habits. If we look around us, we can see that plastic is a common element in our lives; it is almost impossible to find any object that does not have plastic in its composition: toys, school supplies, kitchen utensils, tools, furniture, shoes and an infinite etcetera; but among all the possible varieties, the biggest problem are **single-use plastics**.

Single-use plastics are those plastic products designed and manufactured to be **used only once** and then discarded: disposable cups, bottles and cutlery; straws; candy, cookie or noodle wrappers; courtesy bags in stores and supermarkets; jam, yogurt or cheese pots; packaging of all kinds and many others are discarded just a few minutes after being used. It is estimated that, worldwide, only between **9% and 13%** of plastics are **recycled**. Because of this and because they take several centuries to degrade, most **single-use** plastics end up polluting ecosystems, especially the maritime one, where they end up being part of the huge **Plastic Islands**.



How can we help reduce plastic pollution?

As we have already said: we live in a world where plastics play a crucial role, so first of all, it is very important that we look around us and re-think about our habits: how much of the plastic we use in our daily lives ends up in the trash can just a few minutes later? Packaging, straws, swabs, bags, bottles, plastic wraps - the amount is enormous. Once we are aware of this, the next step will necessarily be to become very careful with the disposal of our waste and, above all, to be attentive to what actions can help us reduce plastic consumption. Here are some possibilities:

AT HOME

- Avoid using straws to have your drinks (you can also avoid them when you drink outside your home).
- Consume home-squeezed fruit juice instead of industrialized or powdered juice (apart from avoiding packaging waste, they are healthier).
- Use glass containers to keep leftovers or store groceries.
- Avoid disposable plastic tableware and, if necessary, choose those made of biodegradable materials, such as bamboo, cornstarch or wheat bran.

AT THE SUPERMARKET

- Always use cloth bags: they can be used for years and are easy to wash.
- If you need to use a single-use bag, make sure it is made of recyclable paper.
- Pay attention to the packaging and containers of the products you buy. Try to choose, as much as possible, the ones that contain the least plastic, for example: a detergent packaged in a cardboard box is easier to recycle and harms the environment less than one sold in a plastic bottle.
- Buy products in bulk, whenever possible, to separate and store them in your own containers.
- Buy pastries, biscuits and fresh bread that are not packaged or do not come wrapped in plastic.
- If you live in a place where the water is not of high quality and you need to buy bottled water, choose returnable containers and the largest possible ; then fraction the water using glass jugs or bottles (you will see that this procedure, apart from reducing pollution, is also cheaper).



CHAPTER #6

AWAY FROM HOME

- When eating ice cream, have it served in a cone or edible cup instead of a plastic container.
- Always take your own cup or travel mug with you to avoid the use of disposable ones (there are stores that offer discounts for taking them with you).
- When choosing a place to eat, take into account the amount of disposable tableware used to serve the food (fast food chains usually generate a lot of pollution).

AT SCHOOL

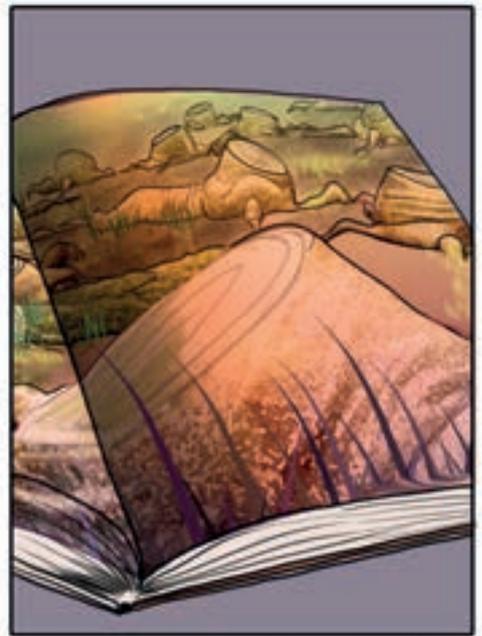
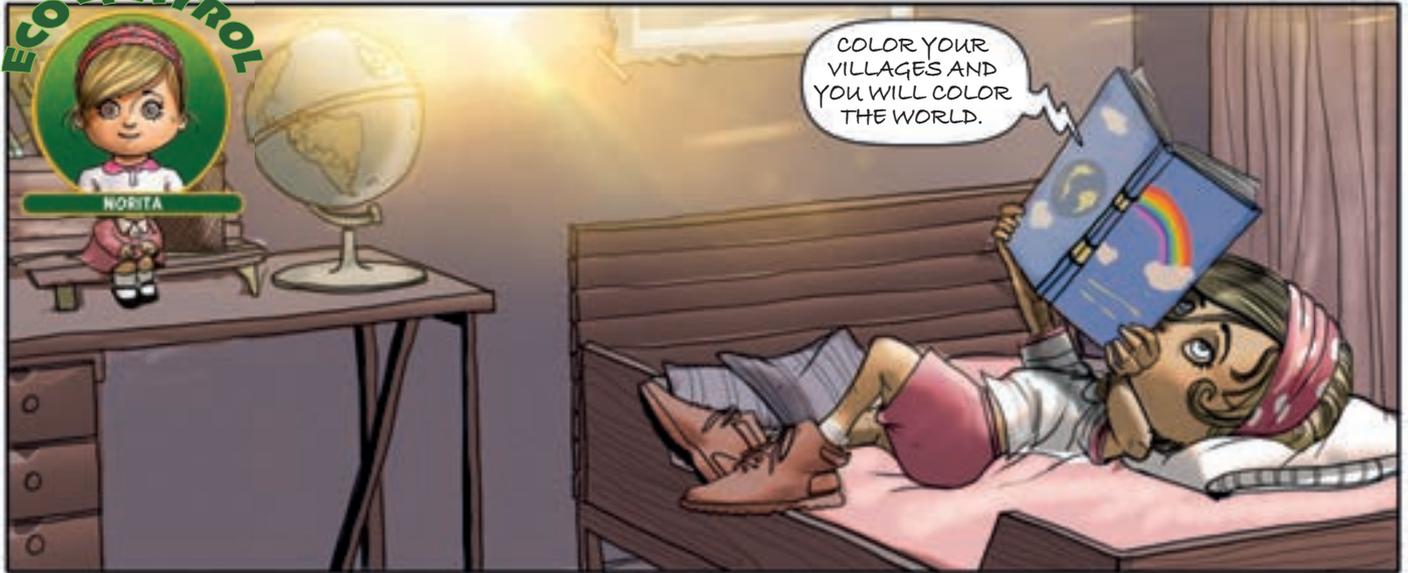
- Take your snacks to school in reusable containers and, if possible, cover your food with recyclable paper instead of aluminum foil or plastic wrap. Cloth bags and reusable containers are not only eco-friendly, but also easy to wash, so they are even more hygienic than single-use containers.
- If you like to take fruit to school, remember that it is not always necessary to peel or slice it. The whole fruit comes in a natural, nutritious and 100% biodegradable container: the peel. Just make sure you wash it well before consuming it.
- When carrying water from home, do not use disposable plastic bottles; always prefer reusable bottles, such as those used by athletes.
- Try to use sheets of paper, notebooks and folders that are made of recycled paper, and opt for school supplies, such as rulers and set squares, which are made of wood or biodegradable materials instead of plastic.
- Choose refillable pens, as well as crayons and pencils made from environmentally friendly materials (there are pencils that contain seeds and, once used, can be planted).
- When buying a new backpack for school, look for the ones made with organic fabrics. If this is not possible, choose one that is made from recycled plastic.

Of course, these are not the only possible actions to reduce the consumption of **single-use plastics**, there are many more that we would like you to investigate.

Kako and his parents “discovered” the plastic islands while sailing in the sea; we must “discover” them in our daily lives. From the very moment they begin to form, we must do everything in our power to stop them growing, by reducing the circulation of single-use plastics and thus helping to avoid all the damage they cause to nature.

Chapter #7

Norita changes her village



IT IS SAID THAT HISTORY IS A SCIENCE THAT STUDIES THE PAST SO THAT WE DON'T REPEAT THE SAME MISTAKES WE HAD MADE. A NEW GENERATION IS NEEDED TO CHANGE THE WAY WE LOOK AT ISSUES SUCH AS ECOLOGY AND FRATERNITY BETWEEN RACES, CREEDS AND NATIONS, AND THE LONG TERM PLANNING OF SUSTAINABLE ECONOMIC AND ENVIRONMENTAL POLICIES.



CHAPTER #7

According to history, in the 19th century, the great Russian writer Leo Tolstoy coined the phrase “paint your village and you will paint the world”. Tolstoy surely never imagined that, almost two hundred years later, for a 21st century girl named Norita, that phrase would be a way of painting the problems of her own time. Today’s children and teenagers have many tools to learn about the history of environmental destruction that their elders are passing on to them and, certainly, they will not want to repeat it. And in order not to repeat it, as Norita wishes, it will be fundamental that we rebuild our village as a previous step to rebuilding the world, since it is an obvious fact that a very large proportion of the world’s pollution has had its origin in our villages.

To avoid repeating a history that can’t be repeated, it will be essential that our villages fully turn to **Renewable Energies**, so that, little by little, our world also turns to them before it is too late to repair the damage that we have been causing for several centuries.

Renewable energy

At present, almost all human activities are powered by **non-renewable energies**, i.e., different forms of energy that are extracted from nature and that at some point will run out forever. And they will do so because they cannot be regenerated or there is no way to produce or extract them at a profit, or at least without loss of money.

We all know and use non-renewable or **conventional energies** in our daily lives. We are talking mainly about fossil fuels (oil, coal, natural gas) and nuclear power plants. These sources of energy are all polluting and limited, because sooner or later they will run out. To a large extent, what Norita sees in the photos of her book the consequences of using these energies, which is why our hope for the future lies in **renewable energies**.

Renewable energies are those forms of energy that, in addition to being abundant and obtained from natural sources, are practically inexhaustible, since nature itself constantly regenerates them. The main advantages for the environment are that neither their production nor their waste is polluting, or only to a very small extent, since these energies **do not produce** greenhouse gases. Furthermore, from an economic and social point of view, they improve energy security, economic prospects and job creation.

Renewable energies are numerous and varied. It is very difficult to cover all of them, but we can mention the main ones:

- **Wind energy:** obtained from wind power by means of windmills and similar devices.
- **Solar energy:** it comes from sunlight and radiation, which in some cases are collected by photovoltaic panels and transformed into electricity and, in others, used to generate heat by means of solar concentrating mirrors.



CHAPTER #7

- **Hydropower or hydroelectric power:** energy obtained from the natural movement of water in riverbeds, waterfalls and cascades.
- **Geothermal energy:** it comes from the heat accumulated in the center of the Earth, which is transmitted through the solid matter it is made of. Volcanic areas are ideal for obtaining it.
- **Biomass and biogas:** these are two ways of obtaining energy from the controlled decomposition of organic matter, both animal and vegetable.

How can we start using renewable energy?

If a large part of the world's problems start in our villages, that is exactly where we must begin to solve them.

We can start with individual changes. When you need to buy or replace a device for personal use, such as a calculator, watch, emergency light, cell phone charger or flashlight, keep in mind that there are many solar-powered options; there are even thermos flasks that not only conserve but also heat liquids using solar energy.

At the collective level, communities can do a lot to promote the use of **renewable energies**; different types of citizen groups such as cooperatives, civil societies and neighborhood groups, thanks to technological progress, now have the opportunity to produce clean energy. There are many possibilities: solar panels and small windmills located on rooftops to reduce electricity consumption; solar water heaters to reduce gas consumption; stoves and boilers powered by biomass pellets¹ and many other devices. This equipment can be purchased and installed collectively to provide clean energy for an entire community, with the additional advantage that their cost is recovered relatively quickly thanks to the savings implied by not consuming conventional energy.

You can also go beyond your village and connect with people from all over the world; investigate and join any of the numerous projects that promote the use of **renewable energies** all over the planet. As an example, you can look for "Citizen energy alternatives against climate change" on the Greenpeace page and join the initiative that excites you the most.

And may the same good things that happen in your village also happen in the world.

¹ A pellet is a small ball or tube-shaped piece of mass (similar to balanced dog food) made from biomass, which serves as ecological fuel for ovens, stoves and boilers.

Chapter #8

Francisco and Climate Change



DAD?

YES, SON?



WHAT IS...



... CLIMATE...



... CHANGE?



CAN YOU REPEAT THE QUESTION, SON?

NOTHING, I DIDN'T SAY DAD. ANYTHING.

CLIMATE CHANGE IS THE GLOBAL VARIATION OF OUR PLANET'S WEATHER CONDITIONS. ALTHOUGH THIS VARIATION USUALLY OCCURS DUE TO NATURAL CAUSES, HUMAN ACTIVITY AND THE MISUSE OF RESOURCES ACCELERATE AND MAKE THE PROCESS MORE SEVERE. CLIMATE CHANGE, OF COURSE, AFFECTS ALL LIVING THINGS ON THE PLANET.



Francisco wants to know what **Climate Change** is and, like so many other children, he asks his father about it, but it is the **weather** itself that answers him the question so quickly that his father does even get to understand the question. In a humorous way, what happens to Francisco shows us one of the most serious problems facing our world today.

It all starts with climate change

When we speak of **climate** we refer to all the characteristics of the atmosphere in a given place: average temperature, cloudiness, amount and frequency of rainfall, humidity, wind speed, among others. In each region of the planet this set of characteristics, i.e. its climate, defines and shapes the lifestyles all the species that inhabit it. If we pay attention to the enormous differences between the plants and animals in a polar region and those in a tropical region, we can get an idea of the importance of **climate** in their development and survival.

The **climate** in any region of the planet can and does **change** due to natural causes, but these changes occur over hundreds or even thousands of years. When **climate change** occurs over such periods of time, species adapt and evolve following the rhythm of nature. But things are very different when the change is caused by humans. This is when we face **Climate Change**.

Climate Change

When we speak of **Climate Change** we refer to **change in climate**, but caused directly or indirectly by all human activities that **alter** the composition of the **world's atmosphere**. Its effects go hand in hand with natural changes and take place in very short periods of time (sometimes decades). The direct consequence of this speed of change is that many species find it impossible to adapt.

What is the impact of Climate Change?

The impact is huge and affects the entire planet. To understand it better we can talk about three levels:

- **Physical Level:** melting of the poles, regression of glaciers, melting of snow, warming and thawing of permafrost, flooding of rivers and lakes, droughts in rivers and lakes, coastal erosion, sea level rise and extreme weather phenomena (tornadoes, hurricanes, etc.).
- **Biological level:** death of flora and fauna in terrestrial and marine ecosystems; extinction of species; droughts and forest fires that cause the destruction of flora and the relocation of fauna to survival areas, which in turn are altered by this migration.
- **Human level:** damage to harvests; death of livestock; impact on food production; spread of diseases and pests; job loss; destruction of homes due to floods, storms and fires; forced migrations of climate refugees.



What can we do?

Before taking any action, we must understand something basic: **Climate Change** is not the origin of environmental problems, but the effect of human activities that are carried out with greater interest in profit than in the well-being of the planet and its inhabitants. Abusive or uncontrolled human actions release **greenhouse gases** into the atmosphere, causing **global warming**, which accelerates **Climate Change**. It is this process that we must stop.

Apart from the responsibilities of states, communities and companies, each one of us can help stop **climate change** by changing our daily habits at home and encouraging our friends and family to do the same. To begin with, we can take into account some tips, which may seem insignificant, but are by no means so.

- **Education:** children and teenagers should know and be taught about climate change and respect for nature, but adults also need to learn, and often relearn, about these issues.
- **Water:** avoid all unnecessary waste of water. You should keep the shower running only as long as necessary; never leave the faucet open while cleaning the bathroom, brushing your teeth or shaving, and never throw any kind of garbage into the sea, rivers or lakes.
- **Transport:** You should always choose to travel by public transport or bicycle. Use your private vehicle efficiently: reduce the use of air conditioning to a minimum and do not accelerate the car while being stopped; remember that fuel consumption and gas emissions increase significantly with speed. If you are planning to buy a new car, consider electric or hybrid models.
- **Paper:** try to reduce paper consumption: whenever possible, use recycled paper or buy notebooks and notepads made from recycled paper; use both sides of each sheet; make only the necessary photocopies or printouts and bear in mind that many documents can be saved in electronic format.
- **Government:** as a citizen, you should support and/or demand governmental measures that favor the long-term sustainable management of natural resources.
- **Trees:** plant new trees, protect the trees around you, fight against indiscriminate logging and prevent wildfires. A single hectare (2.47 acres) of trees eliminates, in a year, the same amount of carbon dioxide that 4 families produce in the same period.
- **Waste:** do not forget the rule of the three Rs: Reduce, Reuse, Recycle. Choose biodegradable and non-disposable products; separate the different types of waste: aluminum, paper, glass, plastics and organic matter in order to recycle them; and always use reusable containers, bags and bottles.



CHAPTER #8

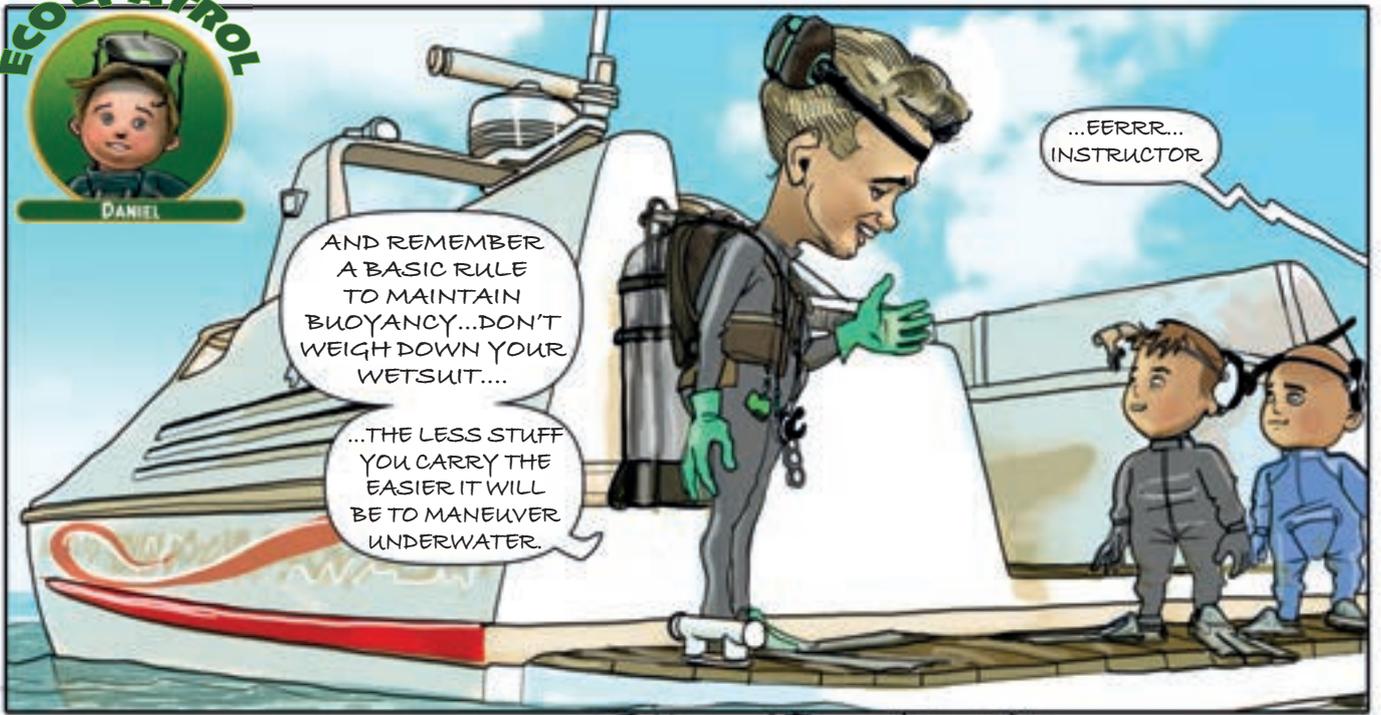
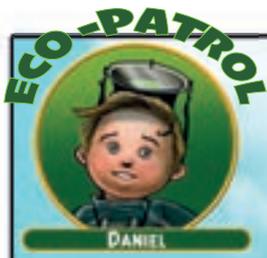
- **Energy:** do not overuse or forget to unplug irons, heaters or stoves; use air conditioning only when necessary, keep the thermostat at 78° F (24°C) in summer and 68°F (22°C) in winter; do not leave stoves on; completely turn off computers, televisions and audio equipment when not in use, stand-by mode also consumes energy; use LED or low-consumption lamps; gradually incorporate solar devices into your daily life.
- **Food:** reduce the consumption of meat and increase the consumption of fruits, vegetables and legumes, preferably locally produced and seasonal; try not to prepare dishes based on exotic animals such as turtles or iguanas; when you eat fish, make sure they are of large sizes and certified as sustainable fishing.
- **Chemical products:** Minimize the use of industrial chemical compounds by looking for natural replacements for: detergents, cosmetics, pesticides and fertilizers.

As we can see, our daily actions have a greater impact on **climate change** than we imagine. However small these actions are, they are no less important or less urgent.

As Francisco experienced at the beginning of this chapter, it is the speed of **Climate Change** that can lead to environmental disaster. At the same speed, nature is asking us to change our behavior.

Chapter #9

Daniel in search for perfect buoyancy



HAVING MORE BUOYANCY CONTROL REDUCES THE RISK OF DAMAGING THE REEFS. IN THIS WAY, YOU WILL ENJOY YOUR DIVES MORE. THEY WILL BE LONGER BECAUSE YOUR CONSUMPTION WILL BE REDUCED AS YOU MOVE LESS AND MORE EFFICIENTLY. IT IS IMPORTANT THAT THE DIVING EQUIPMENT YOU ARE GOING TO USE IS YOUR SIZE AND FITS WELL. AND DON'T FORGET TO HAVE ALL THE HOSES WELL CONNECTED TO THE EQUIPMENT TO AVOID DAMAGING THE SEABED, ESPECIALLY IF YOU DIVE IN WRECKS OR NARROW PLACES TO AVOID UNWANTED ENTANGLEMENTS.



CHAPTER #9

Daniel wants to be a good diver. That requires responsibility and a lot of practice: being responsible for our own safety and towards our partners and the environment, and practicing all the skills that will allow us to dive while enjoying and respecting nature. To achieve this, Daniel will have to learn that it is not convenient to carry too little or too much stuff, but just the right amount; especially if we want to achieve a correct buoyancy control.

Controlling buoyancy

If we achieve neutral **buoyancy** we will be able to move through water more easily and consume less air. Also, our dives will last longer and we will be able to enjoy the beauty of the coral reefs, algae and fish without harming them. Control your position (Trim).

Buoyancy control is an essential skill for safe and enjoyable diving. However, developing this skill requires, apart from patience and practice, a great deal of attention to important details of our equipment configuration and the way we breathe during our dive. To start developing this skill, the three main guidelines we should always keep in mind are:

- Calculate how much ballast you will need: it should be just the right weight, not more or less than necessary.

If we carry too little ballast, we will not be able to dive, but if we carry too much ballast, problems get worse. Excessive weighting is a mistake that every diver should avoid in order to control their buoyancy. Sometimes it is an unintentional error, but others the aim is to facilitate the descent at the beginning of the dive, assuming that it can be compensated with the BCD. What actually happens is that the excessive ballast requires more air to be added to the BCD. This air contracts and expands with changes in pressure and the diver rises and falls constantly and uncontrollably, as if they were a yo-yo. Correct ballast calculation will prevent this problem and the dangers it poses to the diver's safety and the reefs' health.

- Determine the proper positioning of the ballast: not too high and not too low below the waist and with well-balanced sides.

Divers always try to achieve a horizontal position. Once submerged, this position offers the least resistance to progress; and the lower the resistance, the lower the effort, the lower the air consumption, the longer the submerged time and the greater the comfort. In addition, the horizontal position offers the possibility of protecting the environment during the dive. The correct and balanced distribution of the ballast will allow us to maintain this position easily and to float, as if "we were flying", over the reefs without touching them.

- Correct breathing techniques: breathing not only allows us to "live" underwater, but it is also the main tool for buoyancy control.



CHAPTER #9

It is through breathing that we achieve the precise management of this fundamental skill. We can ascend and descend in the water by filling and emptying our lungs with air; we could almost say that they function as a natural BCD. When we breathe, the thorax expands and contracts and thus modifies our buoyancy; just as adding or removing a ballast of about one kilogram would do. Buoyancy control therefore requires slow, deep and conscious breathing.

Protect yourself and the environment

A diver carrying too much weight, with poorly distributed ballast or who does not control his/her breathing needs to constantly move the fins to raise the legs and stay in a horizontal position or avoid sudden changes in depth. As a result, air consumption increases and the diver gets uncomfortable and stressed. But it is not only the diver who suffers; excessive ballasting also has consequences for others and for the natural environment: the constant flapping of the fins raises sediment that makes it difficult to see yourself and your fellow divers, and causes damage to the seabed and coral reefs as well.

And it is not only the ballast that we need to watch out for in order to protect the reefs. Loose hoses in our equipment or unnecessary objects we dive with (as Daniel intends to do) affect our diving experience and the marine environment.

Eco-patrol



Appendix: Suggested Activities
(For parents, guardians and educators)

Less plastic in the oceans: Recycle, Reduce, Reuse

(Chapters 1 and 6)

For children to incorporate the rule of the three Rs as a habit, there is nothing better than encouraging them to get involved in the process, presenting them with ideas like the following or similar ones:

Suggest them to paint and decorate the containers we use at home to separate waste, according to the colors established for each type of waste (green, yellow, blue).

Whenever possible, let them decide whether or not waste is recyclable and/or reusable in order to place it in the corresponding container.

Ask them to suggest new uses for reusable materials, mainly plastics. Any possibility that arises from their imagination should be accepted. Some might take this proposal as an opportunity to investigate possibilities for reuse (there are endless tutorials on YouTube) and others might see it as a game of pure invention. There are no wrong answers or ideas. Anything goes in order to reduce and reuse waste.

For example:

- Making toys (a bowling game made with disposable bottles, puppets).
- Making decorations and handicrafts (pendants, mobiles, bird feeders).
- Making school supplies and tools (shopping bags, pencil cases, purses, seedbeds).

But these are just a few ideas. When it comes to Recycling, Reducing, Reusing, the only limit is imagination.

Protecting forests from indiscriminate logging, deforestation and fires

(Chapters 2 and 4)

We protect and love what we know. The earlier people get in contact with nature, the sooner they will learn to value and protect it. In order for children to bond with the environment in a natural way, the best activities are those that put them in direct contact with it. We suggest four activities that can be adapted or combined according to the possibilities of each place:

1- Research workshop:

At school or at the club, children and teenagers could be engaged in group activities that include research on local tree species (which ones are native and which ones are exotic), an excursion to identify and locate these species in our environment (how many there are, which ones are abundant) and a day out to photograph them. At the end of the process, they can share what they have learned about our trees, the relationship we have with them and their importance. In the school environment, this activity could serve as an assessment, while in the club environment, a photography or similar contest could be held. In any case, the idea is that children relate to and discover the value of the trees around them.

2- To forest:

Following on from the previous activity or as an independent proposal, “forestation” days can be organized in our neighborhoods where children, according to their age, actively participate in the process of planting trees: choosing the species, the locations, making the wells, watering the trees and controlling pests, etc.

3- Reading and writing workshop:

Starting with a legend as a trigger, like the one about the “ceibo” flower in Argentina, you can encourage children to research about other legends referring to plant species in their country.

Afterwards, all the legends that the children have found can be shared. Different stories or different versions of the same story may appear, including legends that are not related to trees or plants, but to nature in general.

Finally, children may be asked to “invent” legends for the trees or plants in their homes or neighborhoods. They can write them down or improvise them, but the important thing is that they then share them.

4- Camping and outdoor life:

Besides being in contact with nature, going camping or spending a day in a natural park offers the opportunity to learn all fire prevention actions: lighting, maintenance and correct extinguishing of campfires, collection of dangerous elements (glass, cigarette butts, etc.) In some places, unfortunately, you can witness the consequences of wildfires but also experience (and perhaps contribute to) the recovery actions.

Food and the sea

(Chapter 3)

It is very important that children recognize and value the origin of their food, particularly the one obtained from the sea and at the same time that they are aware of how necessary it is to take care of the environment it comes from.

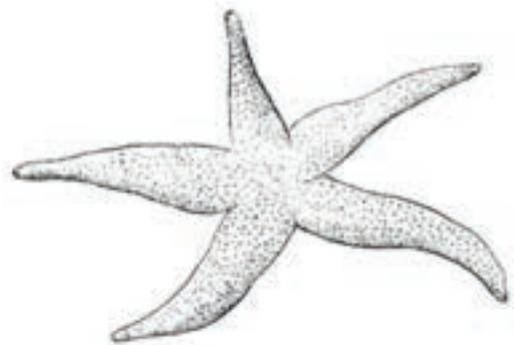
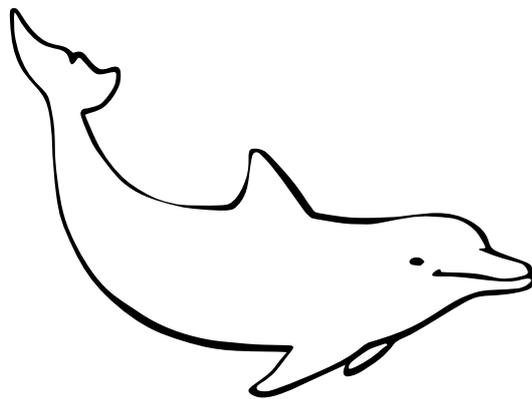
Awareness should be gradual and according to their age. There are many possible activities. Here are just a few examples.

I - For the little ones:

“Paint and Color”

Provide drawings or models for coloring that represent different aquatic species, but suggesting that the choice of colors should be based on a research work on these species and their characteristics, such as: name, typical colors, region they inhabit and the way they are affected by fishing.

As an example, here are some pictures.



Word search

Once the children are able to read, the previous activity can be complemented with word search charts, where the objective is to find the “hidden” species and then look for information about them and their relationship to fishing.

As an example we have the following chart, where the words to find are: dolphin, squid, whale and orca.

D	O	L	P	H	I	N	A
E	W	H	A	A	E	N	S
A	S	H	W	V	H	N	Q
P	C	H	A	O	T	U	U
I	M	M	I	L	X	P	I
N	X	H	C	C	E	N	D
W	O	R	C	A	A	K	P

II - For the older ones:

- To attend, propose and organize talks and debates on sustainable fishing in schools, clubs and community organizations.
- To investigate communication networks, such as the YouTube channel of “Marine Stewardship Council - Sustainable seafood”: <https://www.youtube.com/@MSCorg>
- To encourage children, when going shopping with their parents, to look for



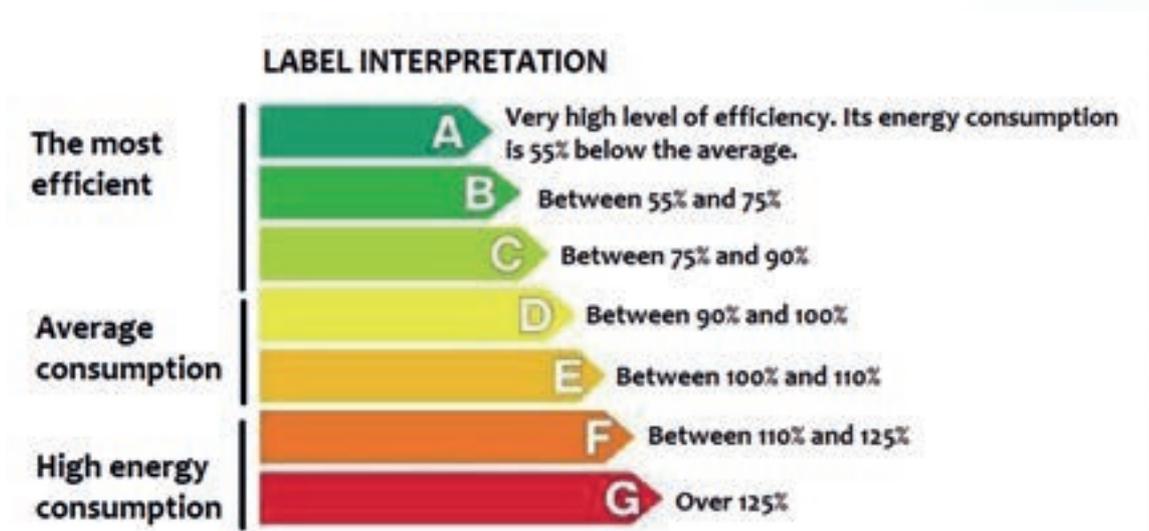
and identify on seafood products the logos that certify the precedence of sustainable fishing:

Renewable energies to fight global warming and climate change

(Chapters 5, 7 and 8)

This section covers the most issues. All the activities proposed above also apply here. We will then add some suggestions for children to learn to use energy rationally and prefer energy from renewable sources.

- Show children with the following table:



Once they understand it, ask them to survey the appliances they find in their homes and evaluate how much they do or do not contribute to energy savings (including the use of the stand by function of many appliances). Then ask them to suggest ways to reduce energy consumption in their homes, schools or clubs.

A similar activity can be done, but starting from the sustainable wood production standards, represented with the following logos:



In places where plots of land are available (in their homes, schools or neighborhoods), set up an organic vegetable garden, which is maintained by children and young people. This activity, in addition to planting, watering and harvesting, can teach them the importance of composting as a way of recycling organic waste. It should be noted that the consumption of food produced by oneself, apart from a great satisfaction, helps to raise awareness about our eating habits.

Suggest a survey in which children investigate which the products with the most plastic wrapping are that are on sale in the markets they go to. Use the results as a trigger to reflect on the real need for such packaging, ways to replace it and the necessary separation and recycling processes.

Divers protecting the environment

(Chapter 9)

Buoyancy control is not only indispensable for comfortable, prolonged and safe dives; it is also one of the main skills that allow the diver to protect the environment. In the case of children, it is learned by playing in a safe aquatic environment, almost always a pool.

We propose three games that are fun and also allow children to acquire skills that will improve their buoyancy when they learn to dive.

All the suggested games take place in the shallow end of the pool. Participants must have goggles or masks and there must be at least one adult with a snorkel or scuba equipment who can control what happens underwater.

1. Treasure hunt: For this game we need to have a group of objects that sink and have bright colors or stand out from the background color of the pool. These objects (small balls, coins, small stones, etc.) will be the “treasures” that children have to collect. At the beginning of the game, the participants will be inside the pool, facing away from an adult who will act as referee. The referee throws the treasures into the water, trying to scatter them as much as possible; then, at his/her signal, the participants turn around and try to collect as many treasures as possible from the bottom of the pool, but on the condition that they never touch the bottom with any part of their body except their fingers, as would happen if they were diving among corals. Another adult, wearing a snorkel or scuba gear, will be the judge in charge of verifying that. The winner is the one who accumulates the most treasures without touching the bottom. A variant of the game consists of throwing only one treasure into the water and competing to recover it.

2. The bridge: This game consists of a team race. For each team there will be an adult who will be located halfway through the pool lane with legs open underwater making a “bridge”. Another adult, wearing a snorkel or scuba gear, will act as “referee”. When the signal is given, one member of each team will swim back and forth across the pool, but must go under the “bridge” and try not to touch the bottom. When the first participant returns to the starting point, the second one leaves and so on, until the team is complete. The referee should keep a record of each team’s time and add seconds each time a participant touches the bottom. The winner is the team which has finished the race in the shortest time. Depending on the capacity of the pool and the age of the participants, there could be more “bridges” along the lane.

3. Bowling competition: The participants are divided into teams. Each team should have a bowling pin (it can be a bottle filled with sand to prevent it from floating) and several hoops with a diameter slightly larger than that of the pin (the hoops should not float either). It is advisable that pins and hoops are of a different color to identify them with each team. The participants will position themselves at the starting point, the hoops at the opposite end and the pins at the midpoint. When the signal is given, the first participant of each team goes to the opposite end, picks up a hoop and returns to the starting point underwater, trying to insert the hoop into the pin without knocking it over or touching the bottom. When the first participant returns to the starting point, the second one leaves and so on until the end. The winner is the team that, in the shortest time, inserts the most hoops without touching the bottom or knocking down the pin.



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UNDERWATER ACTIVITIES**