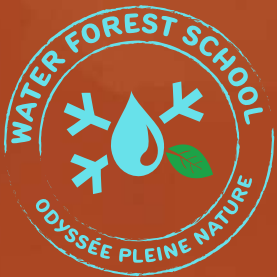




WATER FAMILY
DU FLOCON A LA VAGUE

NATURE BOOK

TREE, EARTH, WATER



FROM 6 YEARS OLD
IT ALSO WORKS FOR GROWN-UPS !



PREFACE



GILLES BŒUF
Biologist and professor

« Trees represent an extraordinary group of living beings classified in plants, evergreens. They can reach impressive sizes. Some well over 30 meters high, and also several meters in circumference. They are very old. Some of them - conifers - appeared several hundred million years ago. We know more than 70,000 species still with us today. They play a significant role in shaping landscapes and have always marked human history. Very young children are particularly sensitive about them, they are so tall compared to them ! and this nature book insists on these fabulous living beings.

The Water Family organization has various goals : to bring awareness to all about the importance of water, living organisms and biodiversity. All living beings are made of liquid water, from viruses to animals, including humans of course ! A newborn baby is more than 3/4 water ! Each human has on him and in him more bacteria than human cells. We know today our health is even influenced by very small disturbances between our cells and all these « symbionts » that live inside of us (leading to obesity, diabetes, hypertension, Alzheimer's disease...).

Therefore, we need to teach our children from their earliest age in nursery schools, about these relationships between all living beings, from the ocean plankton, to our grounds, our forests and meadows, and even in our intestins. Today, we must properly inform our children about the actual situation without over-worrying them : it will allow us to look forward more peacefully ! What is predicted today, might not be sure tomorrow if we agree to change ! Bio-inspiration, nature-based solutions, citizen science, developing the « One Health » program and above all, transmitting the Earth's and Life's wonders !

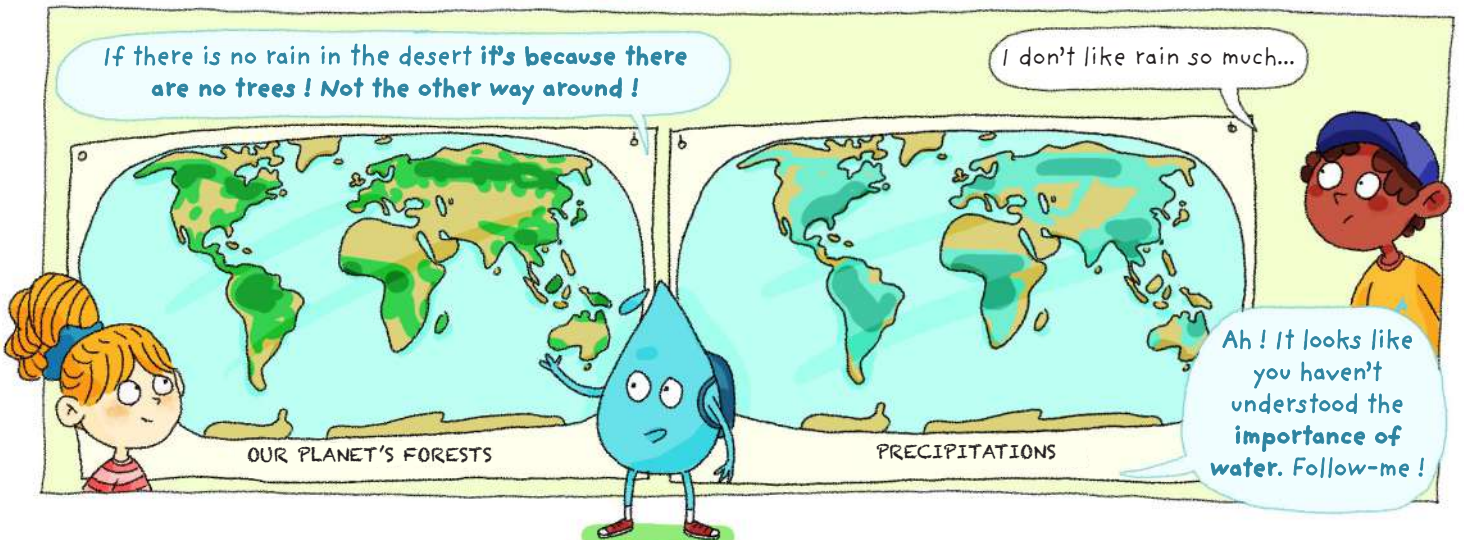
Let's develop an « impact » culture, and especially not destroy and overexploit the living! Let's raise awareness, empathy, solidarity, sufficiency and destroy improvidence, arrogance and greed... Humans need to cooperate, put aside inequalities for a better future ... »

EDUCATIONAL OBJECTIVES

1. Discover the importance of trees and ground quality in the Water cycle
2. Get inspired by trees in our everyday life
3. Reconnect with the living through outdoor activities



The Nature Book aims to raise awareness, **through key information** about the importance of trees, ground and the links they can maintain with the Water cycle! On each double page, you will find experiences and activities to do in nature. **For all outdoor activities, remember to be accompanied by an adult and always dress properly:**
=> good shoes, trousers (to avoid all parasites like ticks...) and sun protection.

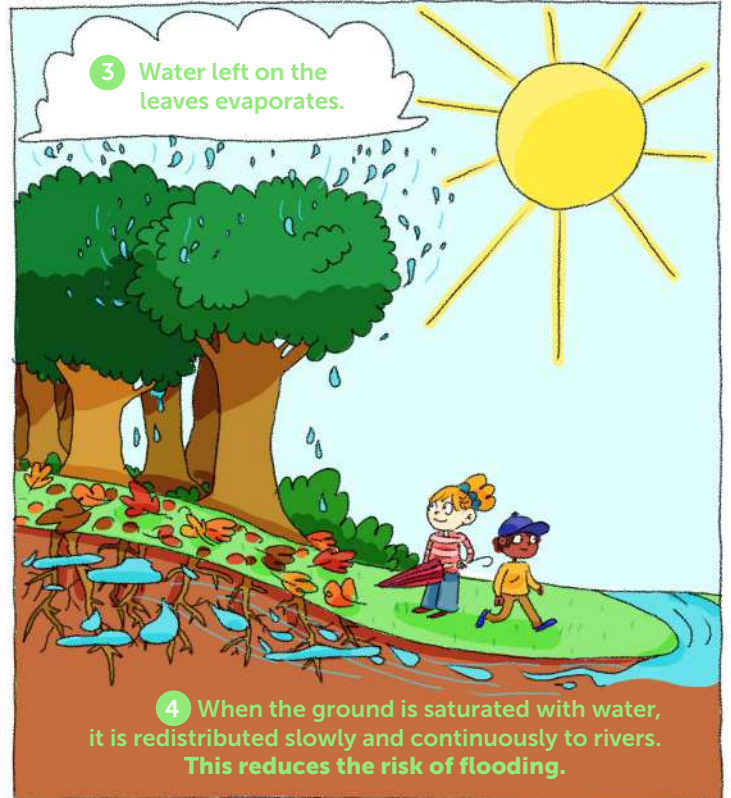
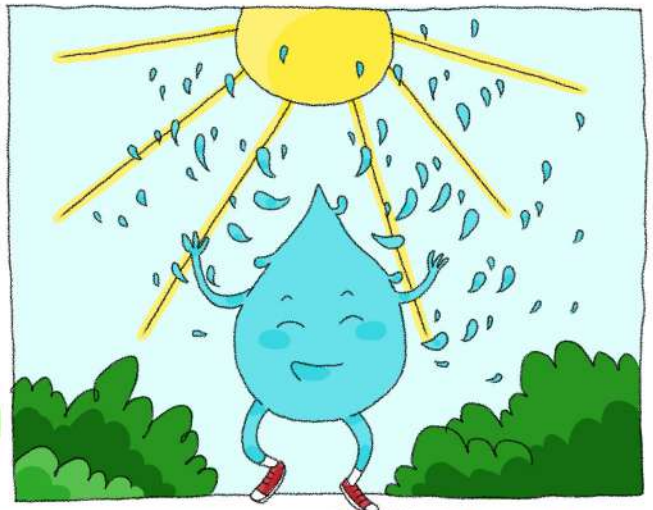


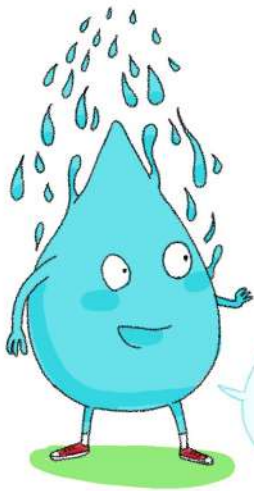
TREES AND WATER

But, what is the connection between trees and the water cycle?



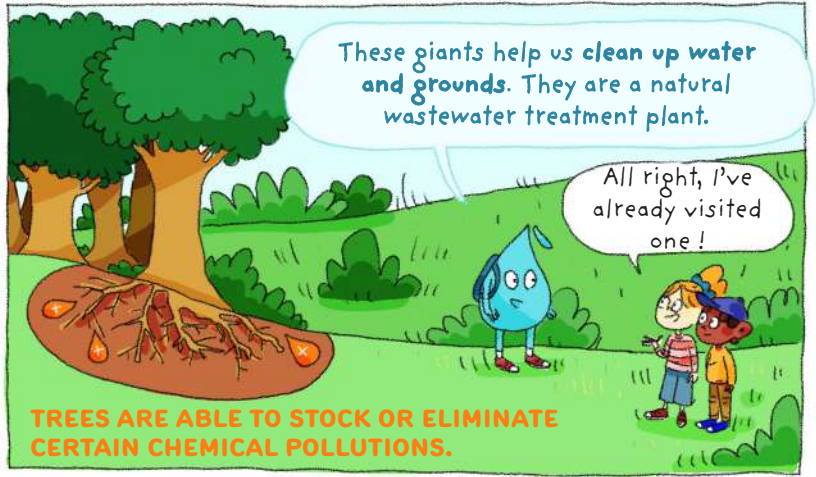
Take this! I will show you.





Wow, this is amazing!

Now, can you see the connection between trees and water? And it's not over ...



These giants help us clean up water and grounds. They are a natural wastewater treatment plant.

TREES ARE ABLE TO STOCK OR ELIMINATE CERTAIN CHEMICAL POLLUTIONS.

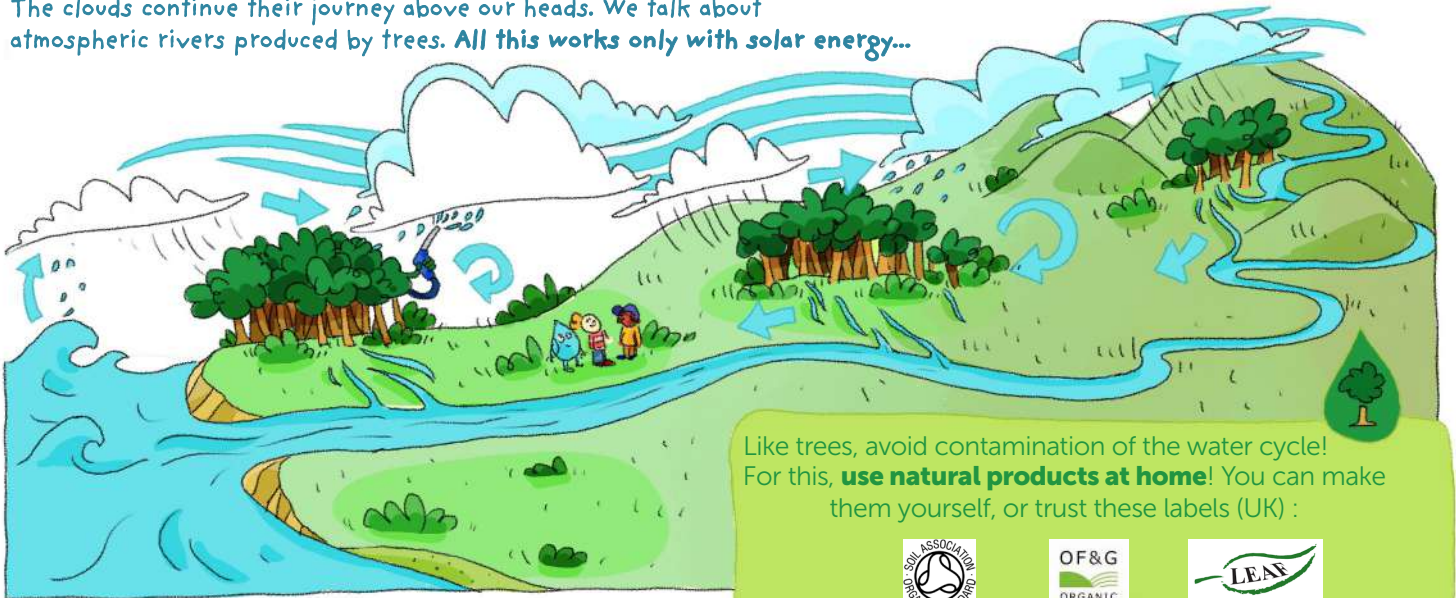
Like trees, humans participate in the water cycle. This is called the domestic water cycle. To work, it needs a lot of energy, and some chemicals, sometimes toxic, that pollute water...

1 The drinking water plant : production of drinking water

2 At home : consumption and pollution of water (cosmetics and cleaning products,...)

3 The wastewater treatment plant : water is partly cleaned before returning to the water cycle (rivers, lakes, ocean).s

... In addition to cleaning water, trees supply the clouds, like a water filling station. The clouds continue their journey above our heads. We talk about atmospheric rivers produced by trees. All this works only with solar energy...



Like trees, avoid contamination of the water cycle! For this, **use natural products at home!** You can make them yourself, or trust these labels (UK) :



ACTIVITIES !

AT HOME : Build your own terrarium so you can observe the plant's water cycle. Flash the QR code to get the instructions



IN THE NATURE : Breathe the ground's smell after rain. After a dry period and right after rain, go to the garden, park or forest and breathe the earthy smell which comes from the ground. It's called...

...Solve the rebuses to know



petrichor = pet + tree + core

HOW DO TREES LIVE ?

Flaggy, I have a question !
What's tree transpiration ?
Is it like sweating ?

Do trees smell
bad under their
branches too ?

Not really...

Trees are able to
produce their own food.
They need :

INGREDIENTS



carbon dioxide, the famous CO_2 which passes through the leaves thanks to mini holes called stomata



water and minerals are absorbed by the roots



sunlight captured by the chlorophyll of the leaves

THE RECIPE OF PHOTOSYNTHESIS

2 Thanks to the sun, leaves transform water and CO_2 into sugar.

3 The sugar will then pass into elaborate sap and feeds the tree from the top to the roots.

1 The liquid called raw sap which contains water and minerals, rises from the roots to the leaves.

CO_2
= CARBON
DIOXIDE

O_2 = OXYGEN

This magical reaction releases two things into the air : oxygen, which you use to breathe, and water ! Tree transpiration is some of the purest water found in nature !

H_2O
≈ 500 L
OF WATER
PER DAY

But how can they absorb so much water every day ?

It is called capillarity. Water is attracted naturally through microscopic pipes situated in the trunk and stems, called capillaries.

Under heat, the water in the leaves evaporates. It's replaced by water from the close capillaries. And it keeps on going, from the leaves to the roots.

A tree can convey water up to 30 meters high, at an average speed of 7 meters per hour.

Wooooow !

Thanks to this way of operating, they have spread all over the Earth, from the top of the mountains to seashores.



Trees are an example of sufficiency, that should inspire us. Here are two main principles about trees :

1 Local and abundant resources :

The resources that trees need are found easily everywhere (carbon, water, sun) and are renewable.

The trees « consume » just what they need and they do this locally, meaning what they have around them.



Hello ?!

Hello, I would like to order this excellent soil from Australia for me to grow properly !



2 No waste / no leftover

All the branches or dead leaves that fall on the ground become food for many living beings (bacteria, fungi, earthworms, insects, ...).

The tree's « waste » is transformed in the soil until it becomes useful minerals for its own growth !



Uh that's weird ! It actually eats its own waste !

Well, no, it just reuses what it needs.



Nothing is lost, nothing is created : everything is transformed ! The tree makes new out of old ! It is one of life's greatest principles.

ACTIVITIES !

AT HOME : Understand better the phenomenon of capillarity by carrying out this experiment.

You will need :

- 1 coffee filter
- 1 glass filled with 1/3 of water
- 1 color pencil

Draw a tree of your choice with roots on the coffee filter. Cut out the tree.

Color only the roots part with the color pencil. Dip the tree in the glass and watch what happens...



IN THE WILD : FRESHNESS OF TREES

In summer, compare the temperature under the shade of a tree and the one under a beach umbrella. Why is it cooler under the tree ?



The humidity of its transpiration cools down the air.

CLIMATE CHANGE

What is organic matter ?

By doing this, the trees put back organic matter in the ground.

It's what living things produce (plants, animals, bacteria, fungi). The more organic matter you find in the soil, the more life develops underground, and more fertile⁶ becomes the soil !



This organic matter is very rich in carbon and this carbon comes from the CO_2 which is absorbed by the leaves of the trees, as we talked !

A tree traps about 22 kg of CO_2 per year !

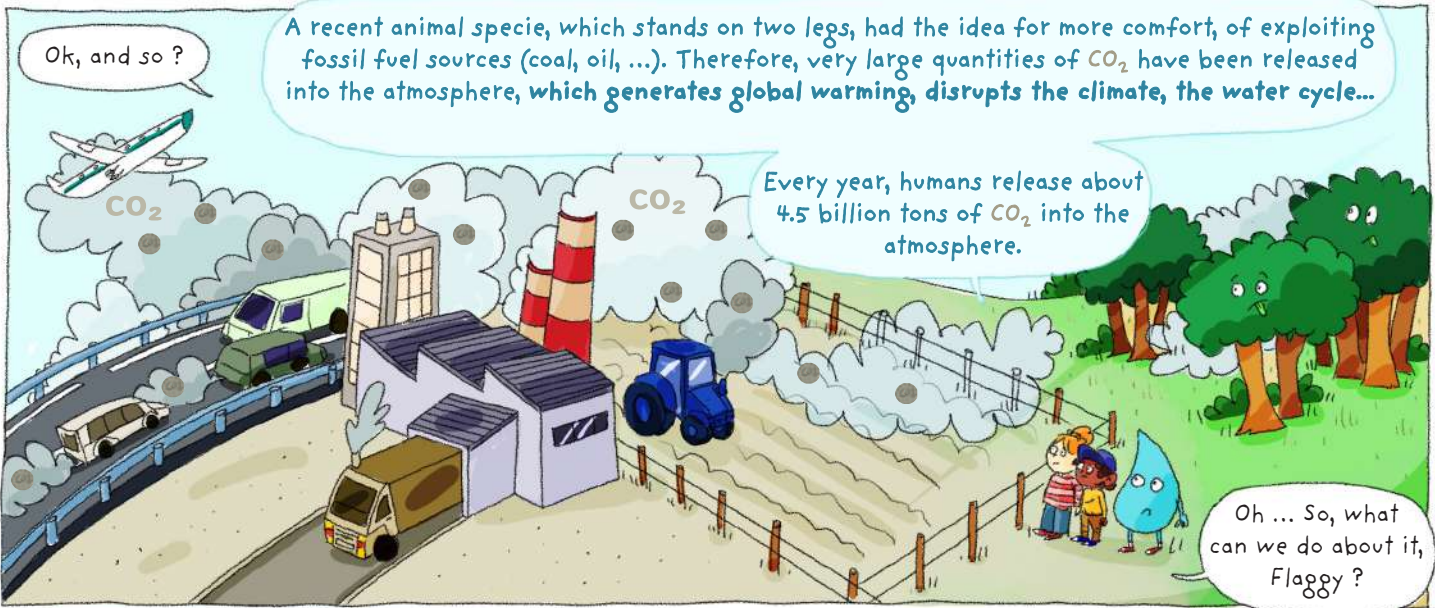


Ok, and so ?

A recent animal specie, which stands on two legs, had the idea for more comfort, of exploiting fossil fuel sources (coal, oil, ...). Therefore, very large quantities of CO_2 have been released into the atmosphere, which generates global warming, disrupts the climate, the water cycle...

Every year, humans release about 4.5 billion tons of CO_2 into the atmosphere.

Oh ... So, what can we do about it, Flaggy ?



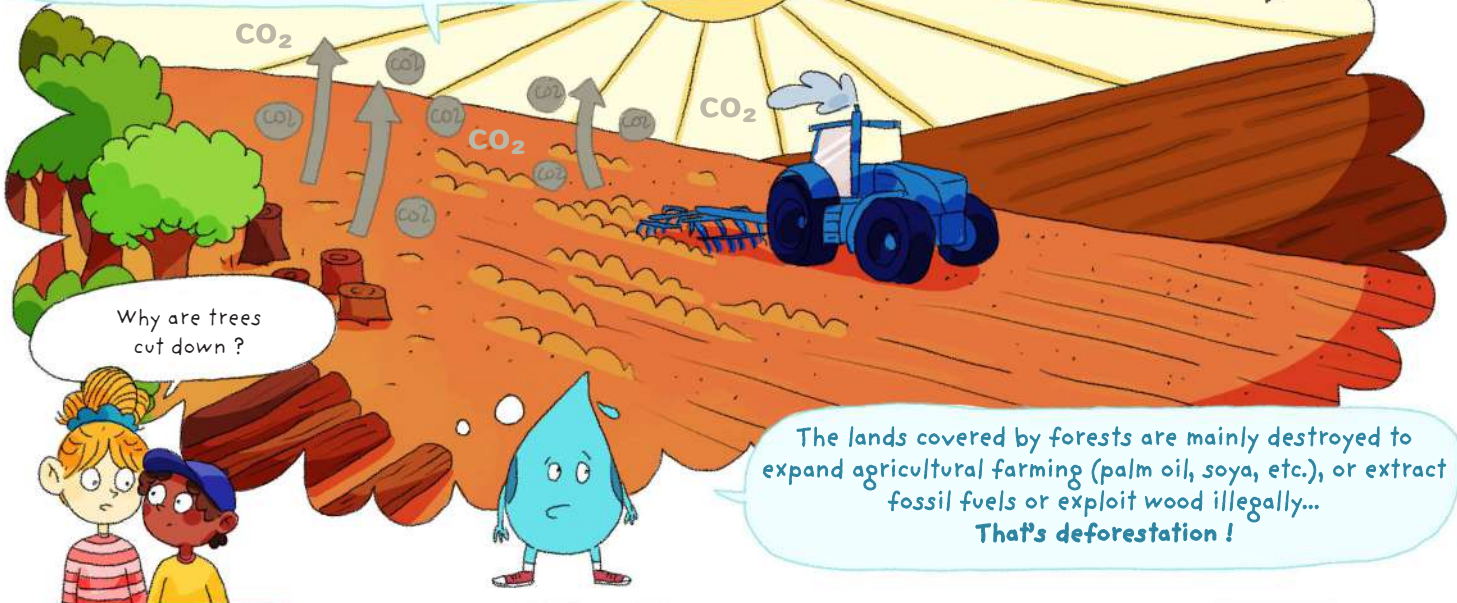
Well, the ground contains between 500 and 3000 billion tons of carbon. They are carbon sinks⁷.

If we protect grounds that are already rich in organic matter and give some back to those that lack it... We could, little by little, recover CO_2 from the atmosphere to put it back into the ground !



The French « 4 per 1000 » initiative launches specific actions to store carbon in the soil and promote practices to achieve it. This could limit climate change and favours food security !

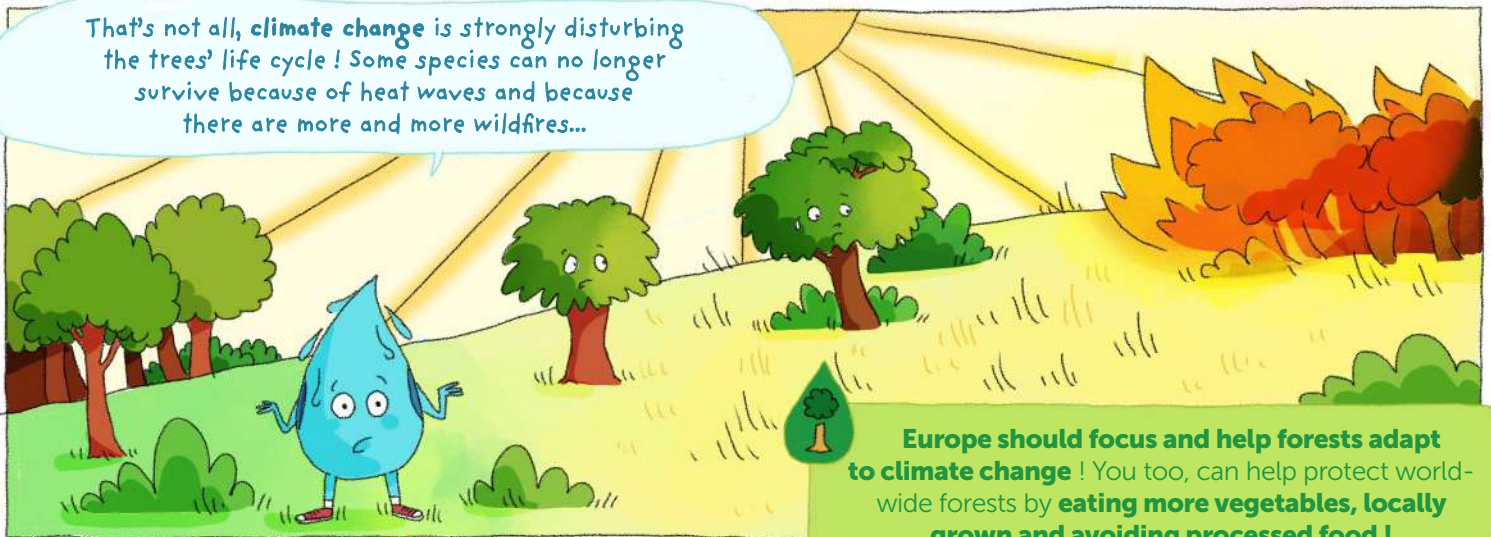
But beware, everytime trees are cut, forests are burnt or grounds are damaged, they stop trapping CO₂. Worse, they release it!



Why are trees cut down?

The lands covered by forests are mainly destroyed to expand agricultural farming (palm oil, soya, etc.), or extract fossil fuels or exploit wood illegally... That's deforestation!

That's not all, climate change is strongly disturbing the trees' life cycle! Some species can no longer survive because of heat waves and because there are more and more wildfires...



Europe should focus and help forests adapt to climate change! You too, can help protect world-wide forests by eating more vegetables, locally grown and avoiding processed food!

ACTIVITIES !

AT HOME : LEARN HOW TO MAKE YOUR OWN COMPOST

Rule n°1 : balance of waste

A balanced mixture usually consists in two-thirds of moist nitrogen-rich material (peelings of vegetables, grass clippings), and one third of dry carbon matter (brown waste : dry leaves and fallen woods).

Rule n°2 : proper level of humidity

It's important to check the mixture's humidity levels weekly in order to regulate it. Too dry it will stop, too wet it will rot and the smell will be very unpleasant...

Rule n°3 : oxygenate the mixture

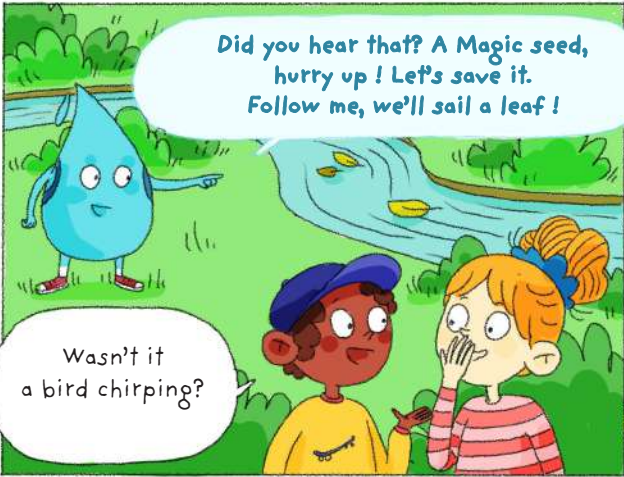
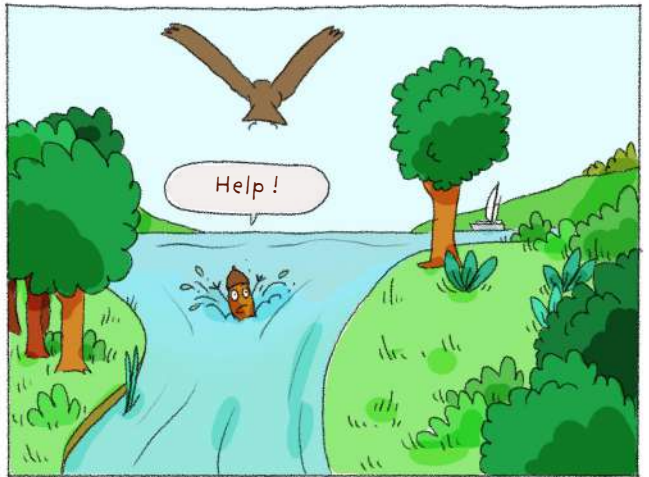
Make sure your compost has access to oxygen! It shelters a whole ecosystem of bacteria, mushrooms, earthworms, woodlice, insects... and they need to breathe oxygen to live. Mixing the compost provides proper ventilation.



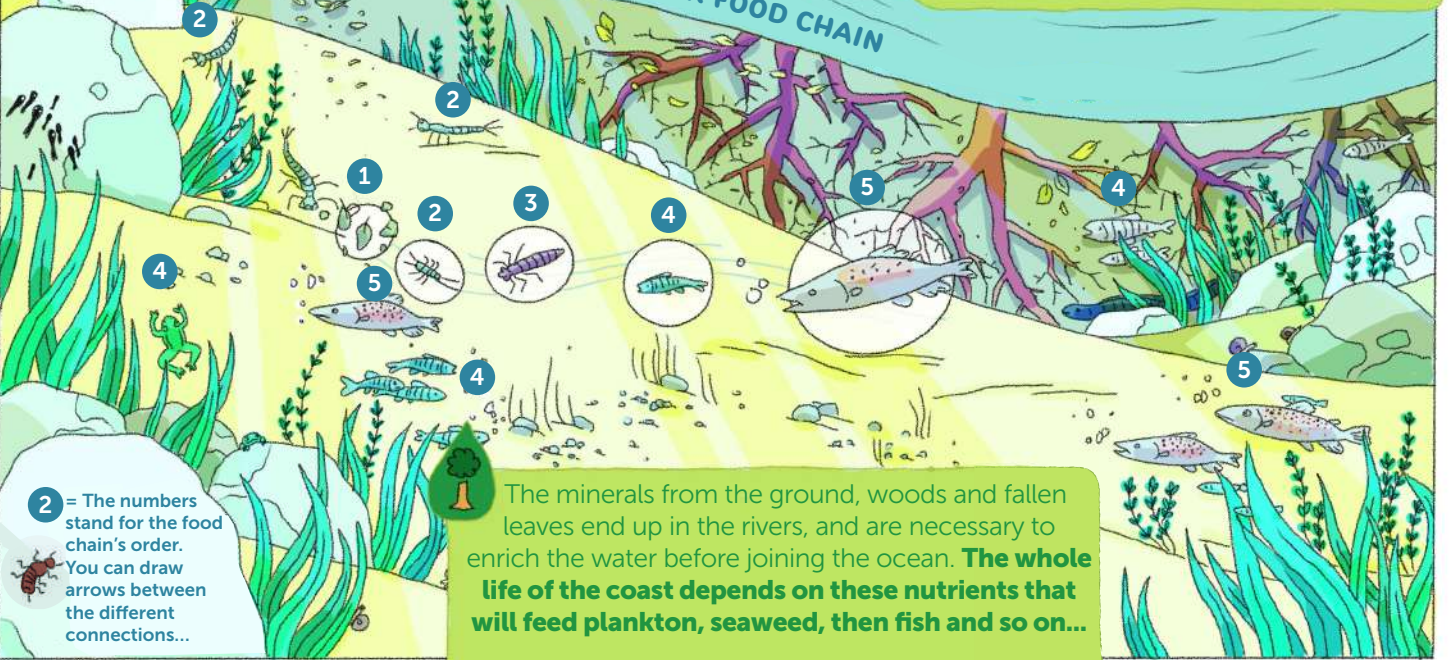
Applying a thin layer of compost over gardens or meadows, improves their ability to absorb carbon from the atmosphere and fixes it durably in the soil.

TREES AND RIVERS

That is why I collect seeds!
To help trees adapt to climate change
and preserve the water cycle...

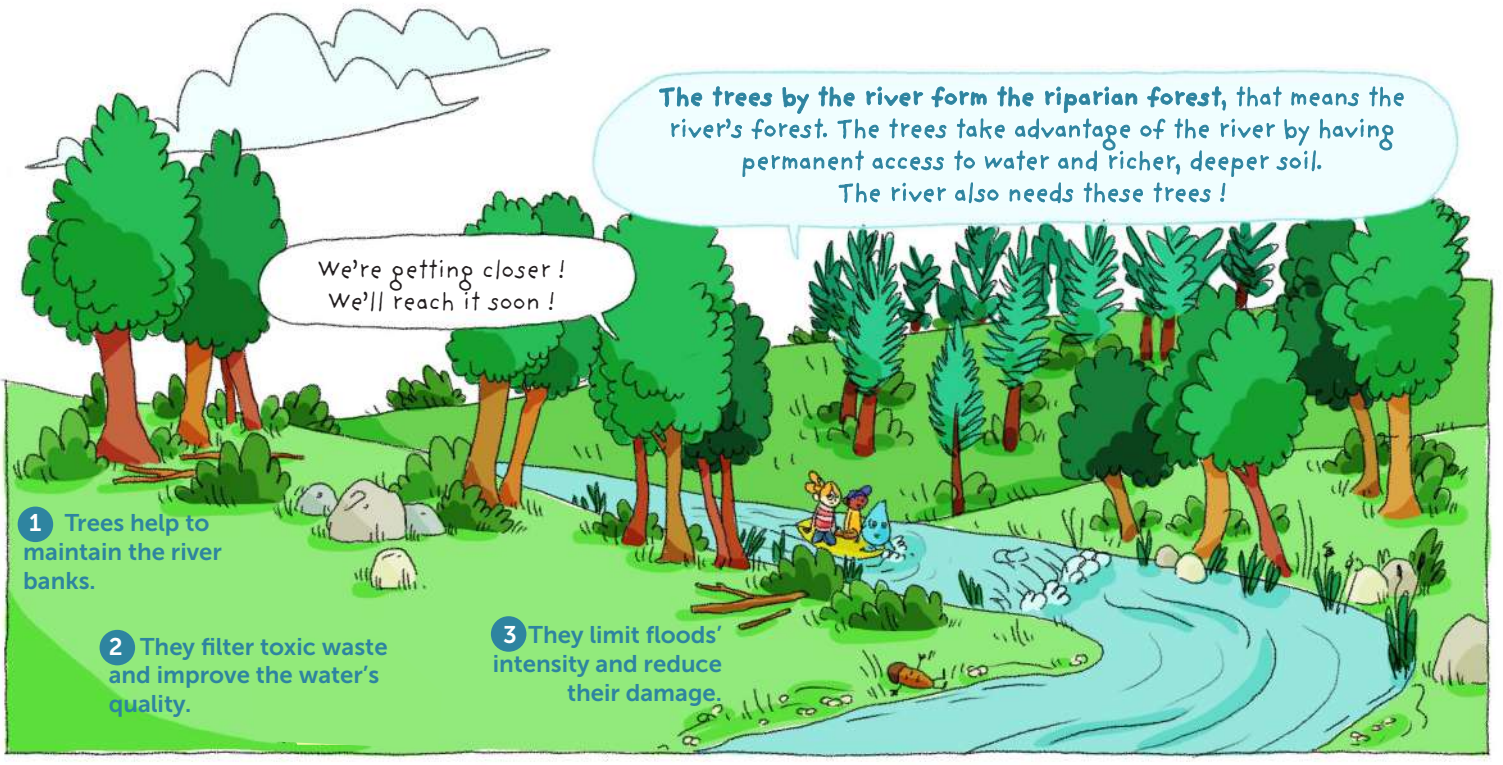


Some tree roots can sense the streaming water and begin to grow towards it. Then, the roots will create microhabitats for all the river's living beings.



2 = The numbers stand for the food chain's order. You can draw arrows between the different connections...

The minerals from the ground, woods and fallen leaves end up in the rivers, and are necessary to enrich the water before joining the ocean. **The whole life of the coast depends on these nutrients that will feed plankton, seaweed, then fish and so on...**



The trees by the river form the riparian forest, that means the river's forest. The trees take advantage of the river by having permanent access to water and richer, deeper soil. The river also needs these trees!

We're getting closer!
We'll reach it soon!

1 Trees help to maintain the river banks.

2 They filter toxic waste and improve the water's quality.

3 They limit floods' intensity and reduce their damage.



The seed washed up on the edge!

Ah! The riparian forest's shade, how pleasant... It also helps to limit the evaporation and allows keeping water in rivers, even in summer.

ACTIVITIES !

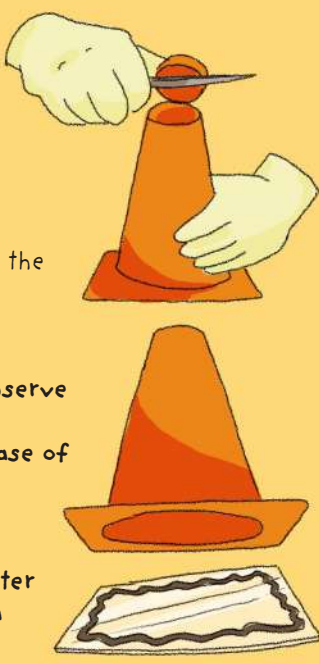
IN THE NATURE : BUILD AN AQUA-SCOPE TO OBSERVE AQUATIC LIFE

You'll need :

- a collective game cone
- a glass or Plexiglas panel of the same size as the cone's base
- some putty/filler

1. Cut out the top of the cone to be able to observe with one eye
2. Glue the glass or plexiglass panel on the base of the cone with putty
3. Leave it to dry so it seals properly

To avoid disturbing aquatic life and have better observations, you can fix your aqua-scope in a pond, for example.



Warning ! An adult must be with you at all times for all observations near ponds or river banks !
(Also, avoid swampy places.)



You will discover underwater tree roots, macroinvertebrates, frog spawn...

TREES AND GROUND



Here the land is already very fertile. Look at all this humus!!!

What's humus ?

Houmous ? Where ?

Humus is all you see above ground. These remains of dead plants and animals are slowly broken down by bacteria, fungi and soil animals. **This thin ventilated layer absorbs and holds water very well.** In short, humus is ideal to grow plants !



The floor looks a bit like a digestive tube. The natural germs of our guts and the ground germs play a similar role for both our health and the plants : they provide nutrients and protect us assaults. **One health !** For all grounds as for us, favour what is natural and avoid chemicals products.



Human, humus and humility have the same etymology. Humbly, let's never forget where we come from !

Abracadatree ! Here we are !
There are all these marvelous little beasts, mushrooms,
bacteria and roots of all kinds...

Awesome !

Uh ! there are
things that are
a bit scary !

Don't worry, they are harmless
and what is most scary is not their
presence but their absence...

1 teaspoon of natural
forest soil contains **over 90 million**
microscopic living things.

Put on your scuba !!!

All those living organisms create many galleries in the ground ! The soil becomes
filled with holes like a sponge and it can absorb water !!!

A living soil is a good answer
to drought and flood problems
experienced repeatedly since several years.

Without trees, there's no organic matter and no life in
the ground. Without roots and soil life, the earth does
not have galleries and the water runs over the ground
instead of infiltrating.

This is ground erosion! The rivers are full of mud and
everything ends up in the ocean... Every year,
between 30 and 40 billion tons of soil disappear.

ACTIVITIES !

IN THE NATURE : OBSERVE GROUND LIFE

Take a bottle, cut it in half and put
the part with the cap upside down.
Collect a piece of ground and place it
in your trap. Then, put your system in
the sunlight. With a magnifying glass,
observe all the soil life that will fall to
the bottom of the bottle.



COMPARE SOIL'S WATER ABSORPTION

For this, take a watering can (10 liters) and pour it :

- 1 on pavement
- 2 in a field or on an outdoor sports field
- 3 in the forest

What do you observe in these 3 cases ?



1

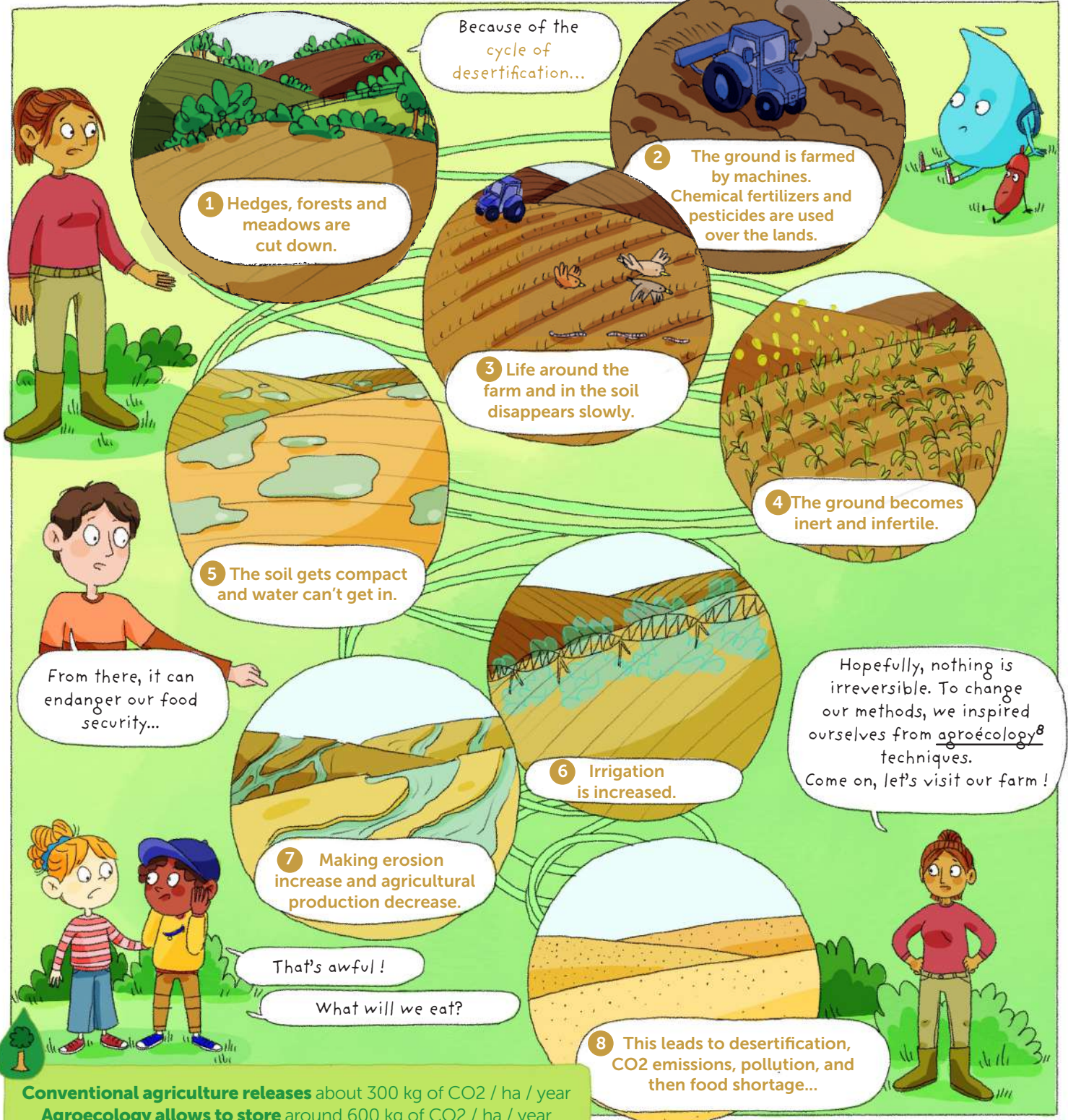


2



3

AGROECOLOGY ET AGROFORESTRY



Conventional agriculture releases about 300 kg of CO₂ / ha / year
Agroecology allows to store around 600 kg of CO₂ / ha / year

We stopped tilling the ground, we reduced the use of chemical fertilizers and pesticides, until we managed to completely get rid of them. Then we mulched the ground, planted trees and hedges, installed ponds... In order to have biodiversity come back and reproduce the water cycle on our farm !



And here's the result ! For sure it's a lot of work, but it makes sense and fills us with happiness. As farmers, our work is to produce healthy food for people, as well as landscapes that preserve biodiversity and the water cycle.



Working on living soil : conservation agriculture, market gardening, agroecology, agroforestry, permaculture... **These techniques are a mixture of ancestral and innovative methods. They are based on the observation of trees and forests, by working with nature rather than against it.** As a consumer, each time you choose to eat products that come from these models, you protect the water cycle, the ground, the climate and life ! And it's so much healthier !

ACTIVITIES !

IN THE NATURE : SHEET MULCHING

A simple technique in agroecology to copy the forest floor is called sheet mulching ! In a garden or a pot, you can try it to grow any plant !

On the ground or in the pot, you can put fallen wood or cardboard. Then on top, you'll alternate layers of nitrogenous matter (grass clippings, horse droppings) and layers of carbonaceous material (fallen leaves, straw). Finally, add organic potting soil on top, and it's ready, all you have to do is plant!



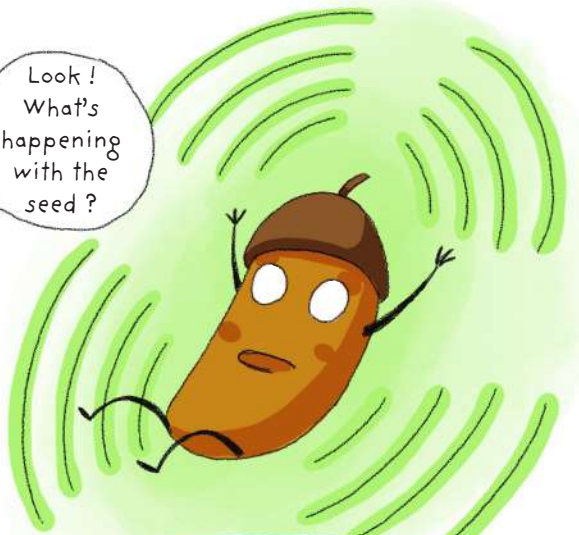
TREES' LIFE CYCLE



Wow this tree looks amazing!

It's nearly 300 years old! Luckily, it's the only tree that's been kept by the previous owners!

Look! What's happening with the seed?



I think it's getting connected!

Here is the story of my aunt, Poppy the seed!



Here the ground looks good.



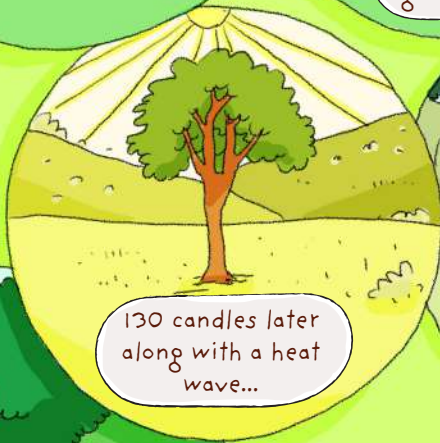
6 months later, germination!



2 years later!



Brrrr! One frozen winter for my 30th!



130 candles later along with a heat wave...



After a few storms... still standing!



200 years now, I have company!



Is that progress?



In 300 years, this tree has known many various situations. If it managed to survive, the million of seeds produced over its lifetime have better chances of surviving as well.

How do they live so long ?

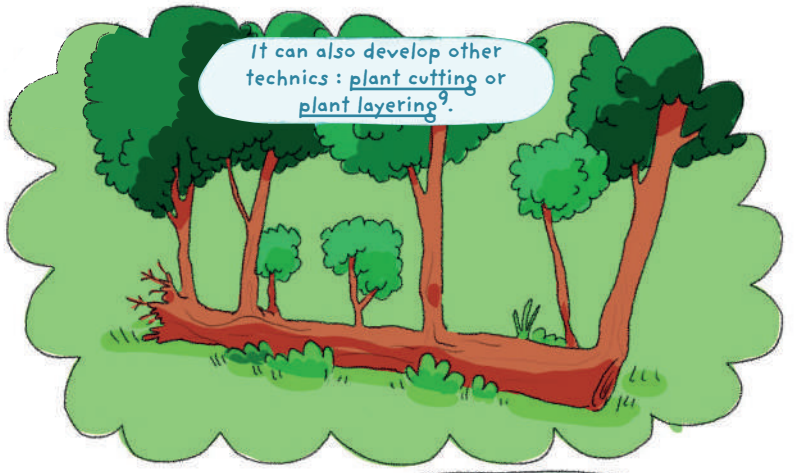


To survive, trees have developed certain defense technics !



Did they learn how to kick ?

Well no. They made toxic sap !



It can also develop other technics : plant cutting or plant layering ?

And they can count on other species.



Yum, I'm going to eat these leaves



Yum, I'm going to eat this caterpillar !



Thanks birdie, you can come visit anytime you want !

Older is the tree, the more broken branches, and wounds, it will have. **They will offer hiding places for biodiversity.**



Even after it dies, a tree continues to be useful for biodiversity ! It is absolutely necessary to protect old trees !

ACTIVITIES !

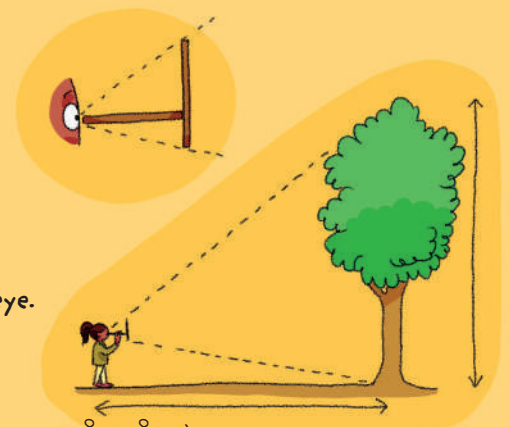
RIDDLE : HOW OLD IS THE OLDEST TREE ON THE PLANET?

To help our forests survive, collect seeds of very old trees ! How do you know if it is an old tree? Usually, they are tall, so calculate the tree size :

IN THE NATURE : CALCULATE THE TREE'S HEIGHT !

Instructions :

- Choose an isolated tree (to have perspective).
 - Take 2 straight rods or 2 pencils of the same length.
 - Create a right angle with the 2 rods and put the horizontal rod against one eye.
 - Move back until the top of the vertical rod coincides with the top of the tree : you are at an equal distance from the tree's height.
- Count the number of steps that separate you from the tree (1 step = 1 meter = 3,28 feet) + add your height. Here, you have the tree's height. If it's tall you can consider it is old !



5484 years old ! It is located in Patagonia, it's a cypress that the locals call «Gran abuelo» (the great grandfather).

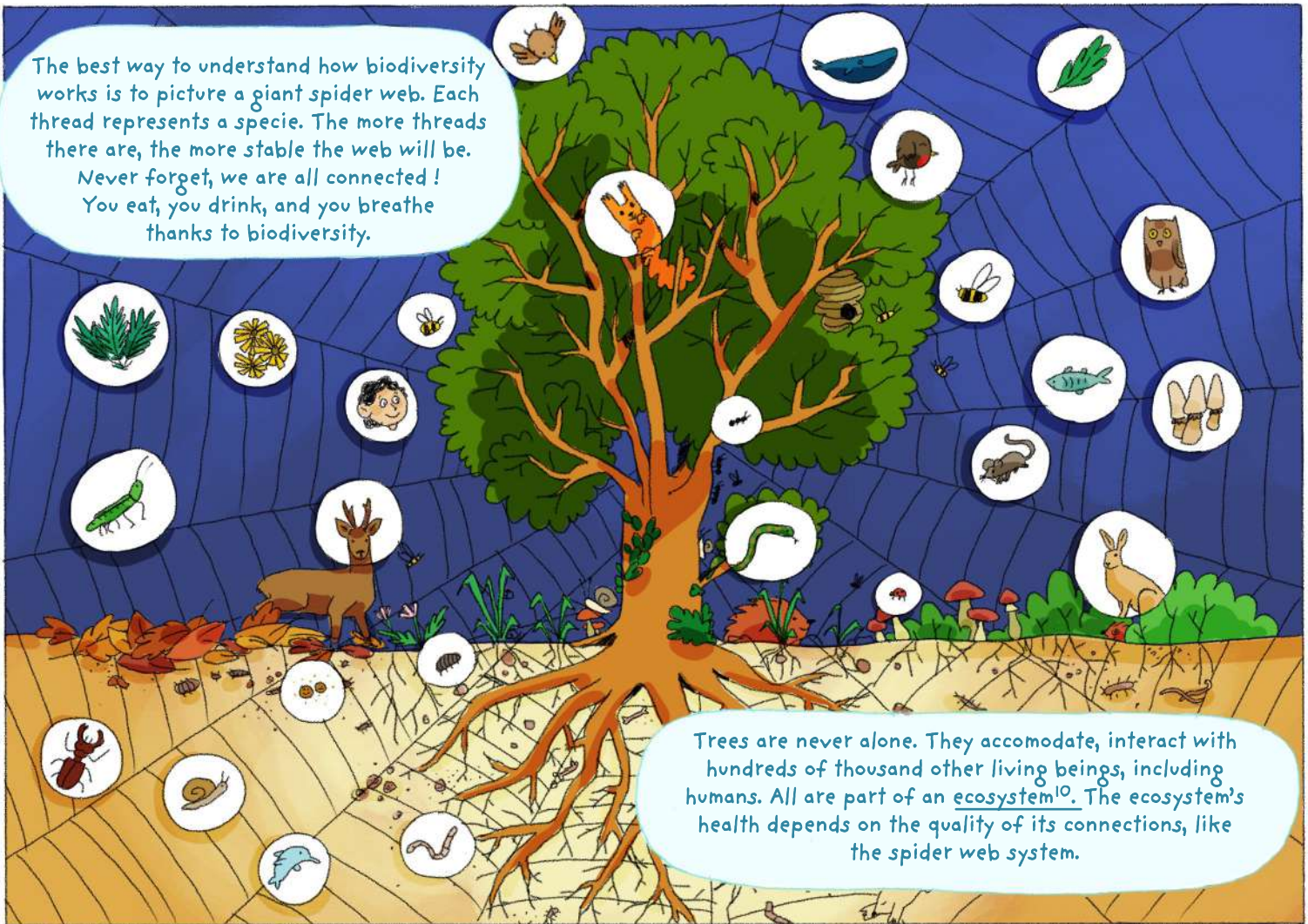
TREES AND BIODIVERSITY

So Flaggy,
what is
biodiversity?



Biodiversity refers to all kinds of living things on our planet, humans are obviously part of it. But when it comes to the champions of terrestrial biodiversity, trees of course are the winners!

The best way to understand how biodiversity works is to picture a giant spider web. Each thread represents a species. The more threads there are, the more stable the web will be. Never forget, we are all connected! You eat, you drink, and you breathe thanks to biodiversity.



Trees are never alone. They accommodate, interact with hundreds of thousand other living beings, including humans. All are part of an ecosystem¹⁰. The ecosystem's health depends on the quality of its connections, like the spider web system.

Today, the ecosystem web is weakening far too quickly because of human activities...

Our hope is that biodiversity is resilient: that means it's able to bounce back after shocks. As long as the species or populations do not disappear completely, they can regenerate over time.



5 reasons for the biodiversity collapse:

- 1 destruction of natural habitats
- 2 over-exploitation of wild species
- 3 climate change
- 4 pollution
- 5 spread of invasive species



The first thing to do is to give way to all living beings. For example, we can try to put together primary forests.

It's a naturally grown forest where there are numerous species living freely without human interference.

What's a primary forest?

It's the forest after nursery school!

The French NGO «Francis Hallé for Primary Forests», aims to revive this type of ecosystem in Western Europe : foretprimaire-franchisalle.org

Then, we must restore pathways for free circulation of biodiversity, such as blue-green infrastructures.

Let's go along that hedge up to the woods.


The blue-green infrastructures (blue for aquatic environments and green for earthly environments), aim to maintain or recreate a network, providing places rich in biodiversity. Also, pathways for animals and plants so they can, like humans, **circulate, eat, reproduce, rest...**

ACTIVITIES !

IN THE NATURE : HOW TO CREATE A DRY HEDGE

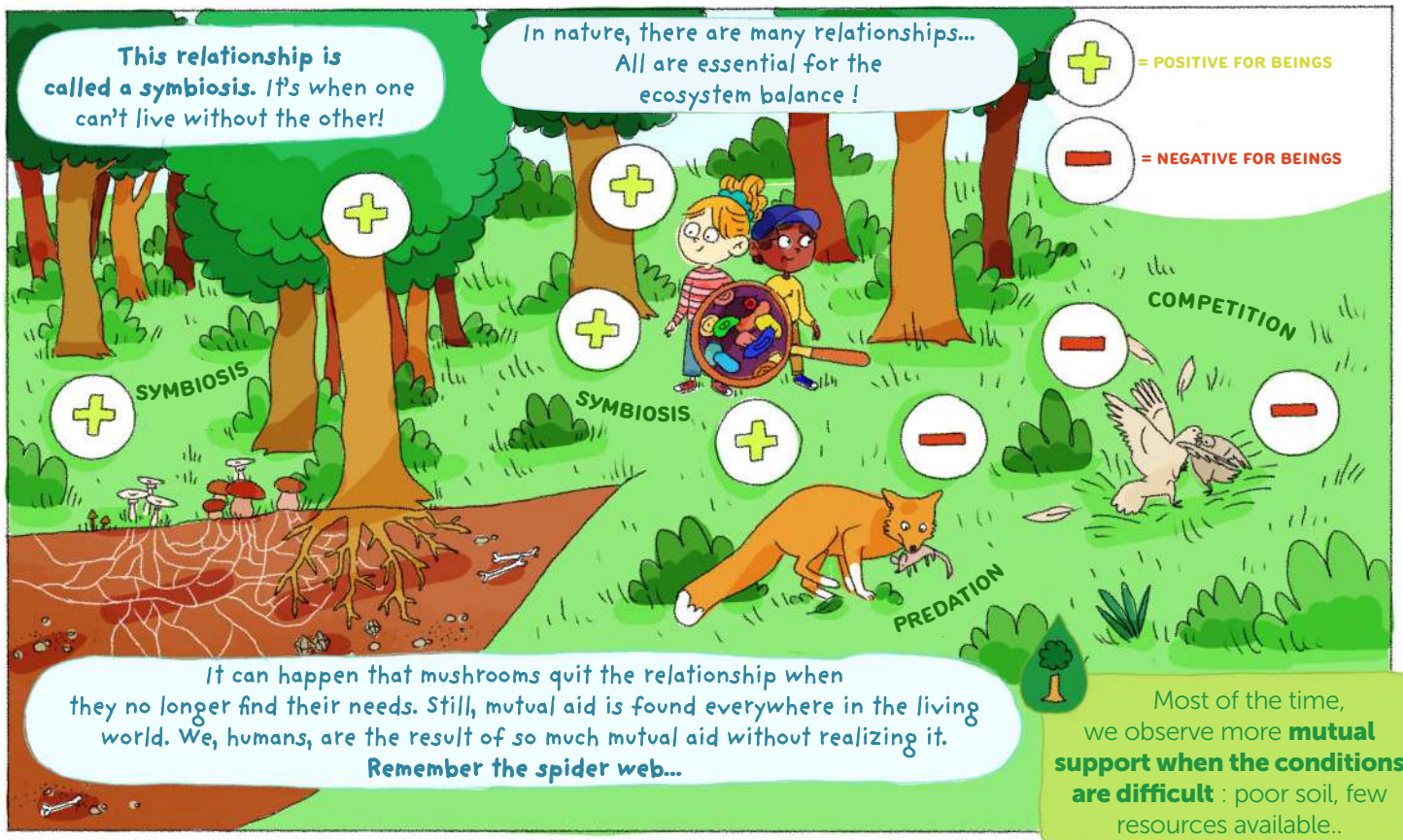
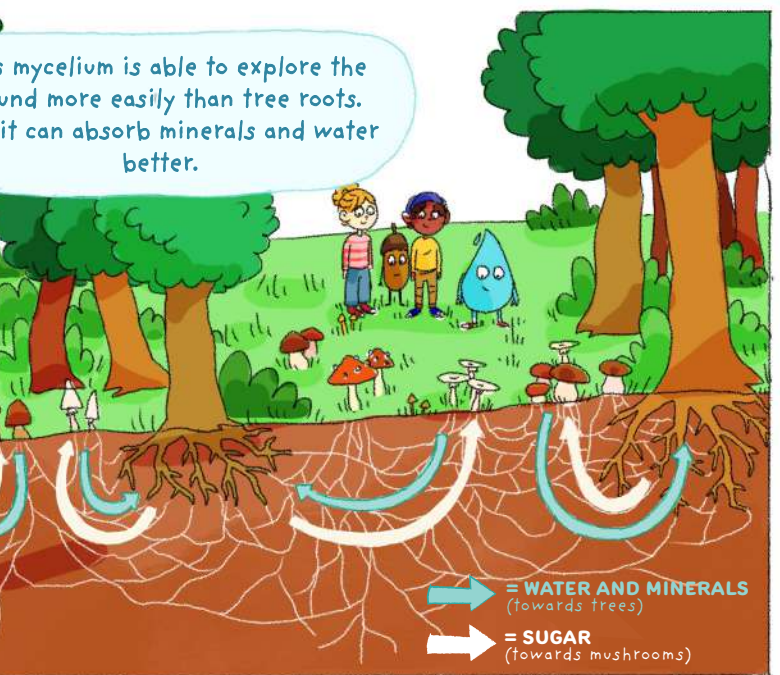
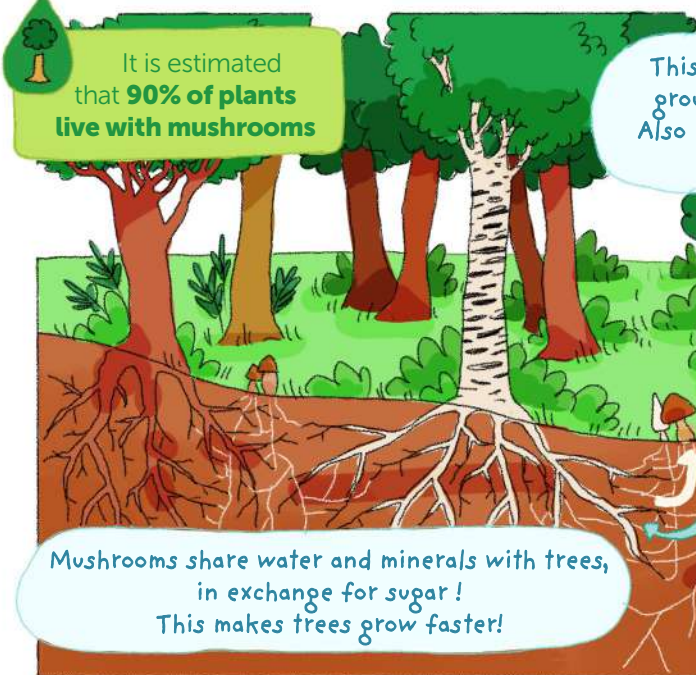
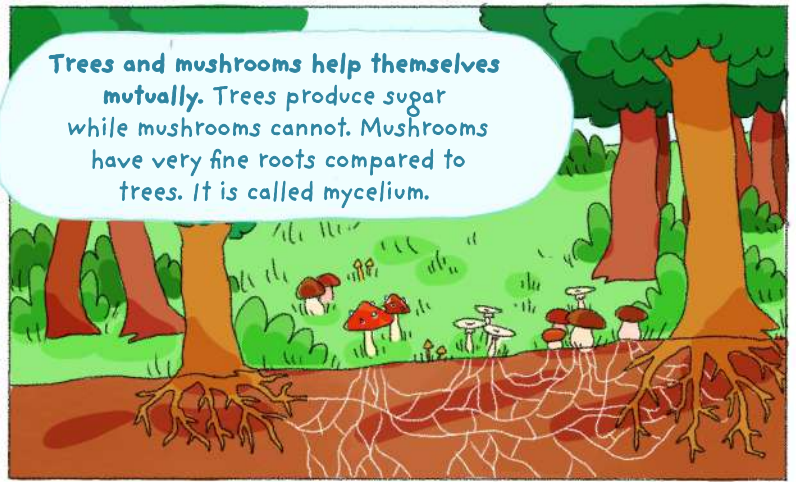
Much of forest biodiversity depends on old trees and dead wood. Wood decay is also a food source for fungi and other wood-eating insects. However, in France, dead wood is missing in almost 75% of exploited forests...

If you have a garden, and you trim your hedges, you can make a dry hedge : two rows of stakes must be planted in a staggered arrangement, the best distance between the stakes is 3 feet. The space between the two rows is 2 to 3 feet. Then fill the space with the branches you just trimmed !

 **Warning !** In order not to disturb the birds nesting, do not trim the hedges between March and August!



MUTUAL SUPPORT



This relationship is called a **symbiosis**. It's when one can't live without the other!

In nature, there are many relationships... All are essential for the ecosystem balance!

- +** = POSITIVE FOR BEINGS
- = NEGATIVE FOR BEINGS

It can happen that mushrooms quit the relationship when they no longer find their needs. Still, mutual aid is found everywhere in the living world. We, humans, are the result of so much mutual aid without realizing it. Remember the spider web...

Most of the time, we observe more **mutual support** when the conditions are difficult : poor soil, few resources available..



They don't text each other like we do. But when attacked (by animals or fires), some trees release gases into the air to warn near-by trees and allow them to anticipate the danger!

 = TREE LEAVES BECOME TOXIC FOR ANTELOPE

Flaggy, is it true that trees can communicate?



There are still fabulous discoveries to make about plant sensitivity and their underground communication ways.

But they don't just communicate with each other. They also communicate with you, animals! Look for example at this hazel tree! What info do you think he is sending to this little squirrel...?



Trees need animals to spread their seeds! In exchange, they have food to live on.

Ok! More stock for the winter. It's perfect there!



Where did I put it?



Oh! It was here!



ACTIVITIES !

IN THE NATURE : SQUIRREL'S MEMORY

In the autumn, collect seeds in the forest where you like to walk and do like the squirrel. Bury your seeds (acorns, hazelnuts, chestnuts, berries etc.). You have made your pantry! Come back in 6 months and find the places where you planted your seeds.

Don't worry, those you haven't found aren't lost. They may become beautiful trees, or they will have served as food for other animals! Remember : seeds and cores need to be in nature and not in rubbish bin!



SERVICES AND WELL-BEING

Trees are soooo smart!

Too bad we don't have this relationship with them.

Well, the truth is some people still maintain this kind of relationship!



In some places on Earth, the first people continue to live in harmony with the living. They are part of nature and are constantly adapting to it.

Their love for the forest is so powerful, as if the trees were members of their family. This explains their commitments to protect the world's greatest forests.



Now, after reading these pages, you will be able to consider trees differently, know them better and be inspired by them.

Also, it's been scientifically proven trees emit gases into the air that comfort us, reduce our tiredness, and increase happiness hormones!! This is forest therapy.

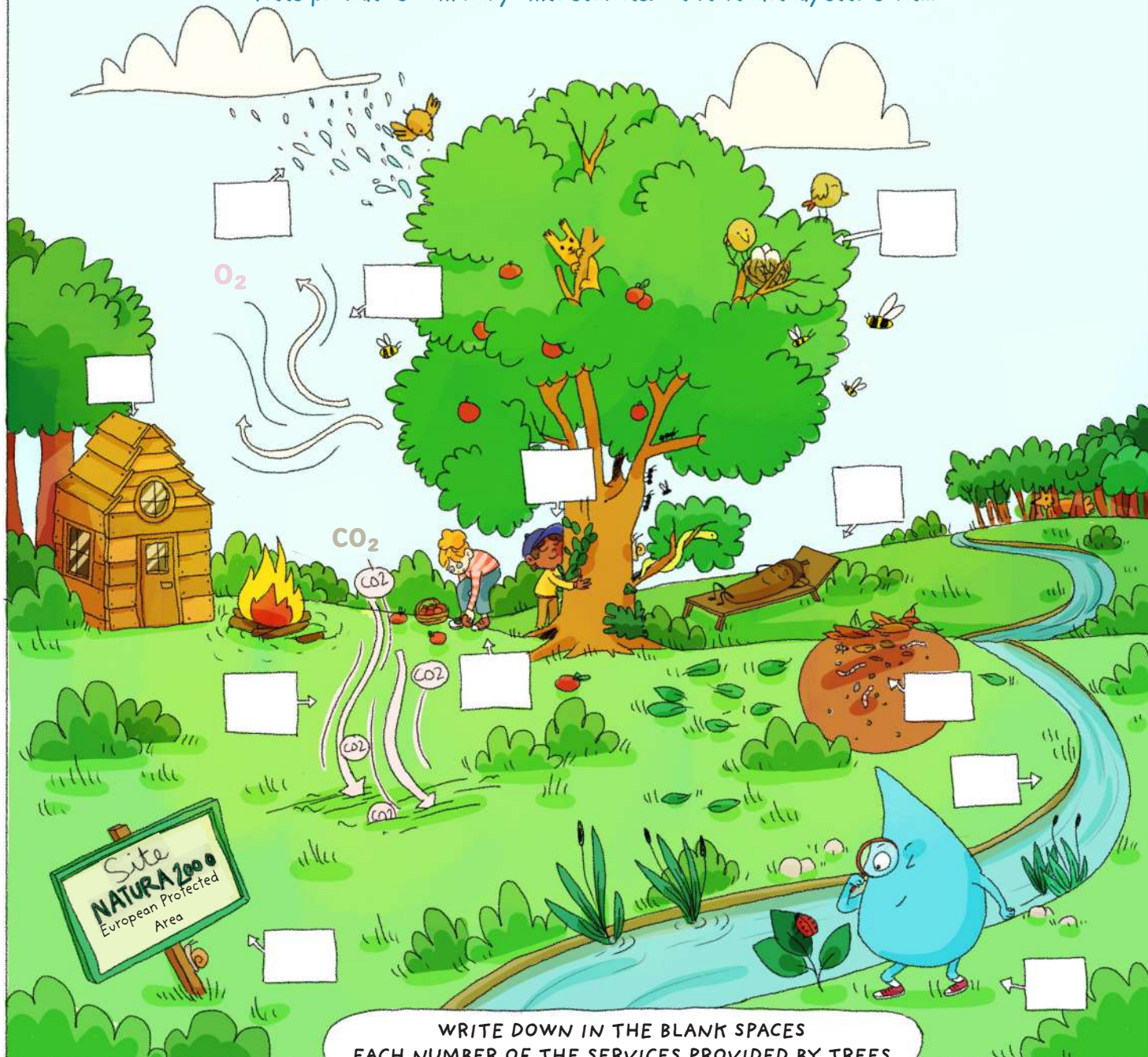
What? Tree farts make us happy?

Yes, but this type smells nice!

That's it! The more time you spend in nature, the happier you'll be!



Trees provide us with many other services! We've already seen some...



WRITE DOWN IN THE BLANK SPACES EACH NUMBER OF THE SERVICES PROVIDED BY TREES

ECOSYSTEMS

- 1 Stock carbon
- 2 Supply the water cycle with pure water
- 3 Provide oxygen (O₂)
- 4 Protect against natural hazards (floods)
- 5 Form and stabilize the soil
- 6 Shelter biodiversity
- 7 Provide shade and temperature regulation



GOODS AND PRODUCTS

- 8 Heating wood, construction wood
- 9 Fruit, edible mushrooms and care



CULTURAL AND RECREATIONAL

- 10 Recreational activities
- 11 Naturalist observations
- 12 Development and protection of forests



ACTIVITIES !

IN THE NATURE : « FIND YOUR TREE » GAME

With a friend or with your parents, have fun learning about trees. Cover their eyes and guide them to a tree. He/she has the right to touch it, smell it, and do everything to memorize it as much as possible. Then, walk away from the tree and remove the blindfold. The person must find the tree you chose !



NATURE-BASED SOLUTIONS

All the explanations make us understand trees are the solution to all our problems!

And more than you think! The major environmental problems are presented in this diagramme! Those are the planetary boundaries¹². And currently, 6 out of 9 have been transgressed!



1 Biodiversity Loss

2 Chemical pollution (new entities)

3 The nitrogen and phosphorus cycle

9 Air pollution (not yet evaluated)

8 Ozone depletion (reduction)

7 Ocean acidification

4 Green water = groundwater

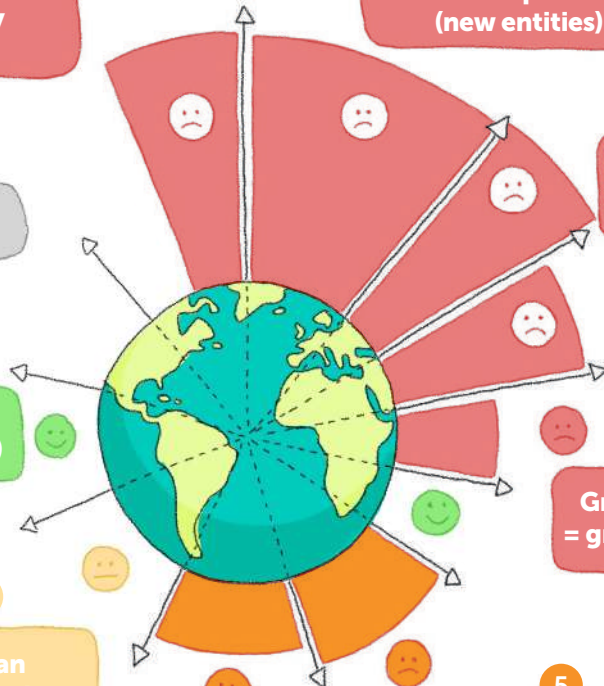
5 Change of land use = deforestation

6 Climate change

We sure can help about the 6 that have been transgressed!



If we want to fight climate change, adapt to it, save biodiversity, reduce pollution and improve the water cycle... We must learn to work with the living rather than against it!

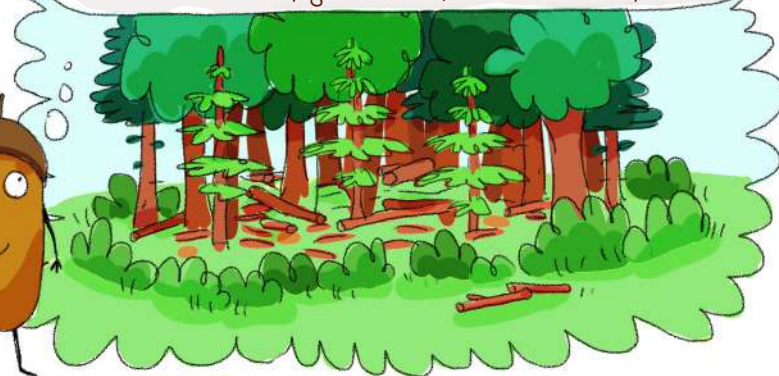
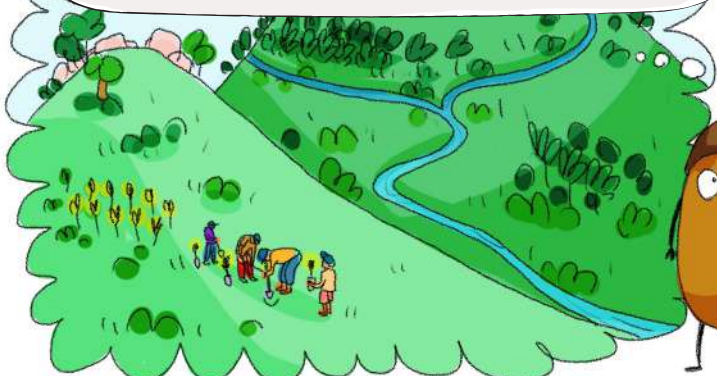


Nature-Based Solutions : three types of actions that can be combined :

- Preserving ecosystems when they are in good conditions.
- Improving management of ecosystems for sustainable use by human activities.
- Regenerating degraded ecosystems or creating ecosystems.

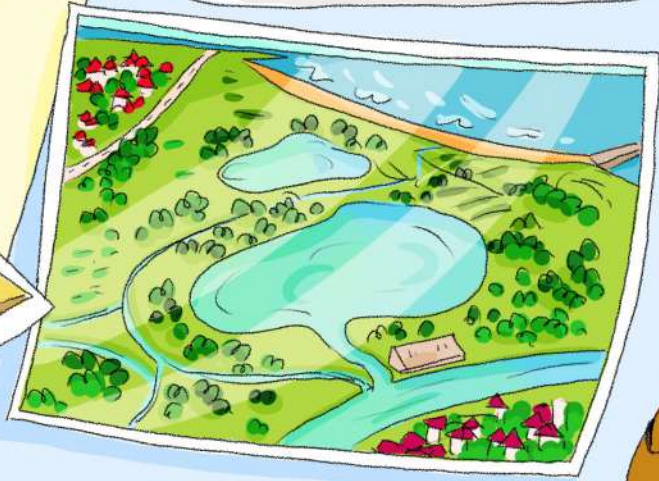
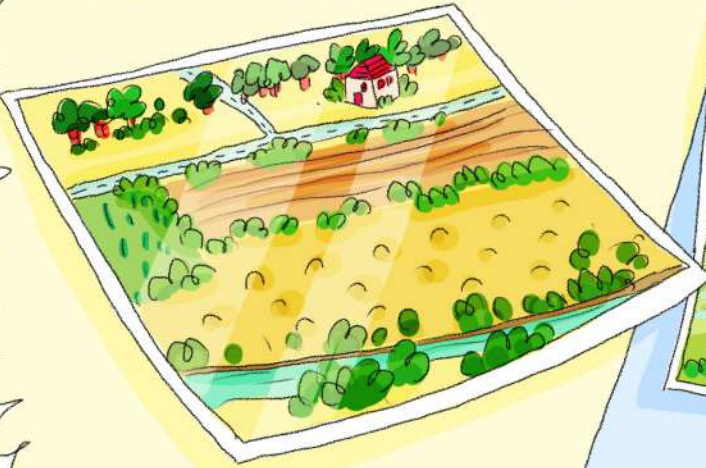
In the mountain environment, we could limit sludge flows and floods, thanks to reforestation. Also, it could maintain the water cycle where the warming has already reached 2 celsius degrees (between 1000m and 2500m).

In the forest environment, we could regenerate forests that have been degraded, and also limit fires with suitable trees! It's important to prioritize trees that are locally grown and promote diversity!



In agricultural areas, we could create hedgerow networks and deploy agroforestry practices. They regulate the climate and the water cycle, preserve the grounds, and create blue-green infrastructures for biodiversity.

On the coast, forests play an essential environmental role such as a biodiversity suppliers, soil erosion controllers and finally climate change adaptators.



In cities, urban forests can limit warming and avoid heat islands. On average, there is a 5 Celsius degrees reduction in temperature thanks to urban vegetation.

And this reduces the fine particulate matter pollution.



We just need to live in harmony... We could really succeed in building a perfect world!

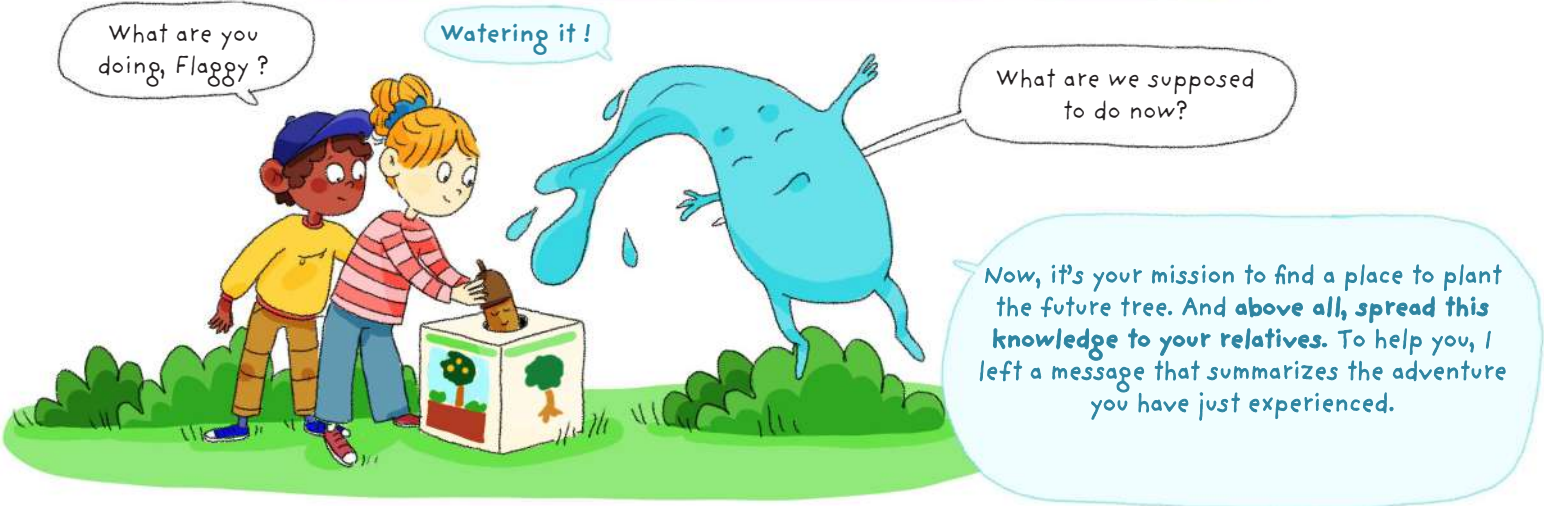


ACTIVITIES !

AT HOME : IMAGINE A GREENER FUTURE !

You can close your eyes and imagine, or take a pencil and draw : a place where you usually go! It can be your house, your school, a park, a forest... Try to visualize or draw the different elements of the landscape (trees, insects you have encountered, birds you have heard, people, cars...). And now add vegetation to make this landscape greener, draw or imagine trees with all the good they can bring to your place. This exercise is very effective in reducing stress and improving your well-being.





TO SUM UP AND TRANSMIT EASILY TO PARENTS AND FRIENDS

Fill in the blanks with the following words :

droughts - services - toxic chemicals - all connected - clouds - first people - cereals - partners - agroecology - climate change - Nature-Based Solutions - 500 litres - shelter - floods - drip - purest - CO₂ - the atmosphere - vegetables - permaculture

We should think of trees and ground differently, thanks to the they offer us, like the do.

They are our greatest in solving the ecological problems encountered today, helped by the

Trees and ground have an essential role in the water cycle ! They help reduce the and by slowing down the rain, and allowing the water to slowly.

Large trees absorb of water per day. The water they sweat is one of the water found in nature, and this gives fuel to the to provide more rain.

Trees absorb to live and each time a branch or leaves fall to the ground it is less CO₂ in This limits It also puts extra carbon in the soil, which will make it more fertile.

Thanks to all this fertility, we can grow and with less water, and it limits It allows us to rethink our way of farming and move towards more respectful models. They honor life and health, such as or

Finally, trees and ground the majority of terrestrial biodiversity. Biodiversity allows us to breathe, drink water, feed ourselves and be healthy. We are !

Congratulations, the seed has grown, you have just become the parent of a young tree. Now you have to plant it in the ground. Here is a blank space to imagine and draw what it will become in 10 years... Don't forget to draw all it will need to live properly and grow !



ACTIVITIES !

IN THE NATURE : HOW TO PLANT A BABY TREE

They say the best time to plant a tree was 20 years ago.
The second-best time is **NOW !**

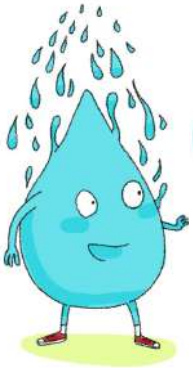
- 1 Before planting, turn over the soil on a 30 cm square and 30 cm deep area.
- 2 Make a hole 10 cm square and 10 cm deep, then place the plant at the bottom of the hole.
- 3 Cover the base and roots with additional soil, approximately 1 to 3 cm high.
- 4 Do not compact the soil too much in order to preserve good ventilation of the soil, which will help its roots develop. Water it with a glass per day for the first week. Then, stop watering it to help the roots learn to grow deep.

If you have a bigger tree to plant, adapt the size of the hole to the size of its roots !

Planfor and the Water Family created the Tree at School programme. This program aims to educate children on the importance of trees for our planet. Planfor nurseries produce millions of tree seedlings each year and offer a baby tree to each child participating in a Water Family activity. These baby trees are a unique chance for some children to create a connection with nature.



TEAM UP TO ADAPT



Hey Benj ! So you are racing again at the Vendée Globe 2024 ? What have you learned from these few pages ?

To be efficient on races or in life, it is necessary to :

1 RECONNECT WITH NATURE

Let's learn to know, respect and take care of nature and all living beings surrounding us !

2 BE MORE SUFFICIENT

Let's move towards more circularity and simplicity. Let's consume better and less, to be healthier and maintain fertility.

3 ADAPT

Let's team up like trees, which are always stronger in a forest, by helping each other to adapt better !



« I have always wanted to carry out meaningful sports projects. My story with the organization has been going on for 6 years now. Teaming up with the Water Family – Du Flocon à la Vague, was obvious. **With my « Water partners », we are convinced that education is the key to a durable change in our attitudes. Our mission ? Transmitting environmental educational values to the sailing sector as well as the people we meet.** Being an ambassador of a project that encourages change and is aligned with my values is essential for me. »

BENJAMIN DUTREUX
Professional skipper

ACTIVITIES !

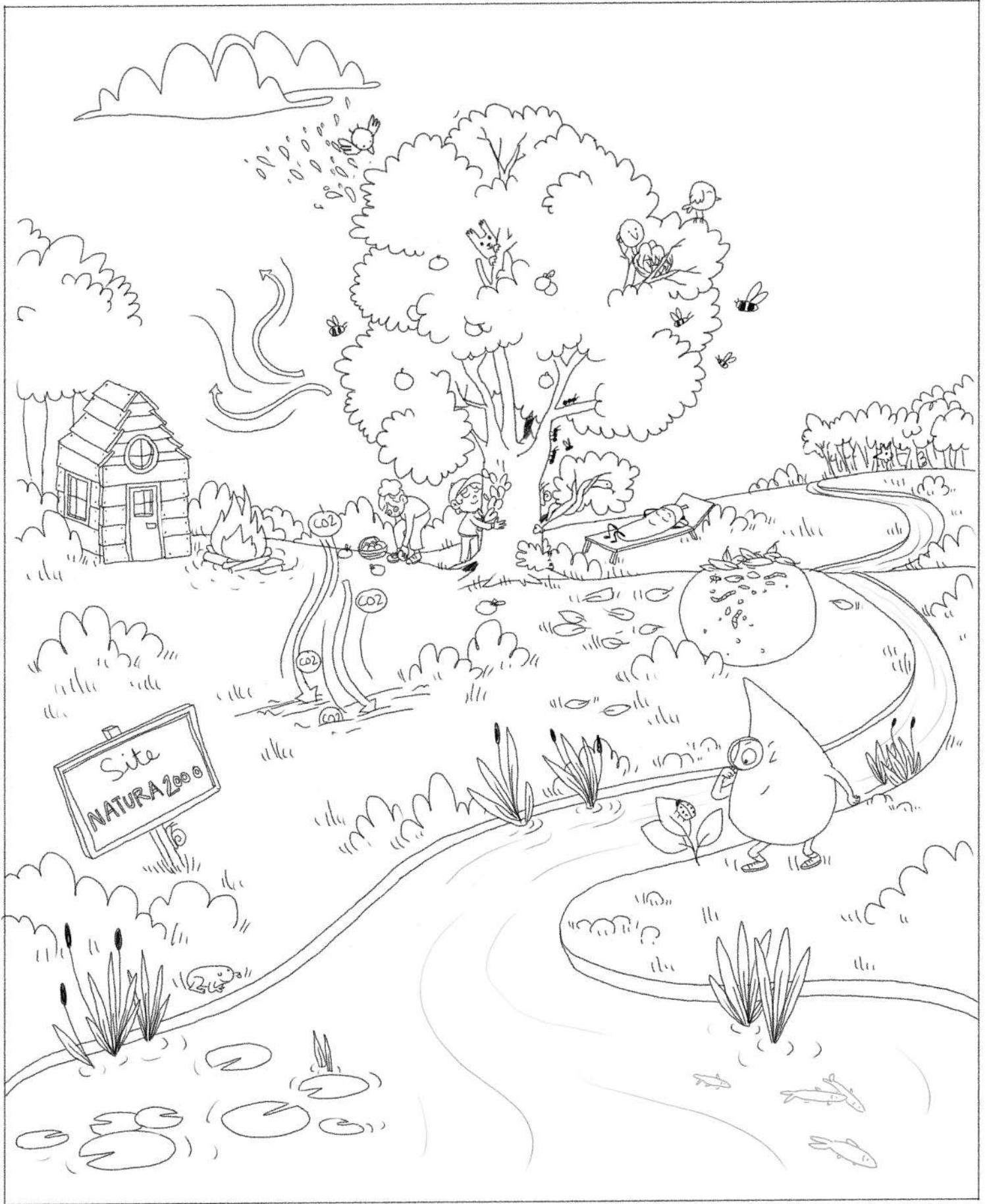
In 2015, countries around the globe agreed on 17 universal Sustainable Development Goals (SDGs) to end poverty, fight against inequalities and injustices, face climate change and build a common world by 2030.

Which SDGs trees can help us succeed ? Circle them and explain why ?

<p>1 NO POVERTY</p>	<p>2 ZERO HUNGER</p>	<p>3 GOOD HEALTH AND WELL-BEING</p>	<p>4 QUALITY EDUCATION</p>	<p>5 GENDER EQUALITY</p>	<p>6 CLEAN WATER AND SANITATION</p>
<p>7 AFFORDABLE AND CLEAN ENERGY</p>	<p>8 DECENT WORK AND ECONOMIC GROWTH</p>	<p>9 INDUSTRY, INNOVATION AND INFRASTRUCTURE</p>	<p>10 REDUCED INEQUALITIES</p>	<p>11 SUSTAINABLE CITIES AND COMMUNITIES</p>	<p>12 RESPONSIBLE CONSUMPTION AND PRODUCTION</p>
<p>13 CLIMATE ACTION</p>	<p>14 LIFE BELOW WATER</p>	<p>15 LIFE ON LAND</p>	<p>16 PEACE, JUSTICE AND STRONG INSTITUTIONS</p>	<p>17 PARTNERSHIPS FOR THE GOALS</p>	

sdg 1, sdg 2, sdg 3, sdg 4, sdg 5, sdg 6, sdg 7, sdg 8, sdg 9, sdg 10, sdg 11, sdg 12, sdg 13, sdg 14, sdg 15, sdg 16, sdg 17...

COLOURING



TESTIMONIES

LAETITIA ROUX



WORLD CHAMPION

17 titles

ski-mountaineering

Project : Be the Change

laetitiaroux.ski/be-the-change

« Thanks to Ernst Zürcher, Marie France Barrier (« Des Enfants et Des Arbres » - *Children and Trees*) and other incredible and inspiring people, I've learned to look at trees differently. Trees are guardians of Time and of the Earth, they have so much to teach us. Connected to the sun, moon and stars they pulse continuously just like our own heart and hold Life's secrets. They are even able to predict earthquakes. Hypersensitive and symbols of longevity and adaptation, they are the source of sources, the origin of life. **Those who know how to listen to them, speak to them and wonder at their beauty, perfection and generosity will tell you how precious and calming they are.** We are nothing in front of plants' genius ! I really hope that this notebook will contribute to raise awareness, allowing everyone to recognize and respect the importance of trees for our future and for life on Earth. »

AYMERIC DE KERIMEL



ECOLOGIST

« Le Chemin de la Nature »

Nature's path

lechemindelanature.com

« Trees are a good sign of biodiversity. The more there are, the bigger they are and the more life there is. Every tree forms a big house for many inhabitants. Animals, bacteria, fungi and sometimes even other plants can live on all levels of the tree, from the tip of the roots, deep in the ground to the last leaves of the crown. **Without a tree, all these living beings wouldn't be here.** For a wide range of biodiversity, dead wood is also essential. Large tree trunks can still harbour numerous organisms of all kinds. **Dead wood is also important for other trees to feed on by recycling it, with the help of fungi and all the little insects growing under the sheltering forests.** »

LAURIE DEBOVE



CHIEF EDITOR

La Relève et la Peste

lareleveetlapeste.fr

« This is one of the major discoveries of the last decades : a tree is never alone, even if it seems arriving by chance in the middle of a field ! **Trees are shelter, pathway, food and energy. These biodiversity champions play many essential roles for many species.** It is now well-known that trees and fungi have a relationship in which they exchange nutrients, carbon, micro-bacteria and water through roots and mycelium. The presence of a tree is enough to produce a whole chain of phenomena that will promote and increase biodiversity. As a crucial element in the water cycle, **the tree continually improves the ecological conditions of the space where it is located, whether in the forest, a field, in the middle of hedges or even in the city.** It's up to us to observe them carefully to protect them better. »

TO GO FURTHER, RESSOURCES AND INSPIRATIONS :

THESE FRENCH RESSOURCES HAVE BEEN OUR INSPIRATION

IF YOU HAVE ENGLISH SUGGESTIONS PLEASE WRITE TO CONTACT@WATERFAMILY.ORG

Marc André Selosse : L'origine du monde : une histoire naturelle du sol à l'intention de ceux qui le piétinent ;

UICN : Des solutions fondées sur la nature pour lutter contre le changement climatique ; **FAO** : les Forêts et l'Eau ;

Maurice Rebeix : L'esprit ensauvagé : à l'écoute des peuples premiers pour une autre façon d'être au monde ;

Baptiste Morizot : Manière d'être vivant ; **Christophe Clanet et Alexandre Ponomarenko** : Comment les arbres pompent-ils l'eau ? ;

Xavier Poux & Pierre-Marie Aubert : Demain, une Europe Agroécologique ; **Jean-Marie Pelt** : La solidarité : chez les plantes, les animaux, les humains ; **Francis Hallé** : Éloge de la plante. Pour une nouvelle biologie. ; **Ananda Fitzsimmons** : Hydrater la Terre : Le rôle oublié de l'eau dans la crise climatique ; **Jean-Luc Galabert** : Comprendre les cycles hydrologiques et cultiver l'eau pour restaurer la fécondité des sols et prendre soin du climat ; **Perrine & Charles Hervé-Gruyer** : Vivre avec la Terre ; **Ernst Zürcher** : Planter un arbre et créer une forêt et Les arbres, entre visible et invisible ; **Pablo Servigne & Gauthier Chapelle** : L'entraide, l'autre loi de la jungle ; **Glenn Albrecht** : Les émotions de la Terre ; **La Relève et la Peste** : Forêts ...

Association Française Agroforesterie ; **Agence de l'Eau Adour Garonne** ; **Arbre et Paysage 32** ; **Solagro** ; **Euskal Herriko Laborantza Ganbara** ; **Office National des Forêts** ; **Vers de Terre Production** ; **Stockholm Resilience Institute** ; **Les alvéoles cultivons l'avenir** ; **La Graine Indocile** ; **La Vie Partout, Sortez tout vert, Des Enfants et des Arbres...**

LEXICON

1. Canopy : is the top layer of branches and leaves that spreads out and covers the forest, it is where the leaves find the most sunlight.

2. Groundwater : is the water present beneath Earth's surface in rock and soil pore spaces and in the fractures of rock formations.

3. Evapotranspiration : is the process by which water is transferred from the land to the atmosphere by evaporation and transpiration from plants.

4. Condensation : is the process through which the physical state of water changes from the gaseous phase into the liquid phase. Water condenses into clouds as droplets. When those droplets grow, the clouds stop containing water and rain starts to fall.

5. Stomata : are little holes like cell structures (invisible to the naked eye) under tree leaves. They allow the plant to receive carbon dioxide and release oxygen and droplets. They allow the plant to carry out photosynthesis.

6. Soil fertility : refers to a living soil that has a huge network of microorganisms including earthworms, fungi and bacteria which all contribute to recycle organic matter and to sustain the soil porosity.

7. Carbon sinks : the Ocean, soils and the Forests are carbon sinks. They store more carbon dioxide than they release. They contribute to diminishing the amount of carbon dioxide in the atmosphere.

8. Agroecology : is an agricultural practice inspired by the natural ecosystems and the way they work. The purpose is to decrease the negative impacts of conventional farming (release of carbon dioxide, pesticides...). It favours biodiversity and food to be healthier.

9. Plant cutting and layering : Plant cutting is a piece of plant cut from its source and falls in a sustainable soil before starting to root. After a while, the plant will grow as a new plant. Layering is a similar process : it occurs when a branch or a stem touches the ground and starts to root and grow as a new plant.

10. Ecosystem : is a geographic area (for instance the Amazon rainforest) where its residents (animals, plants, fungi and bacteria...) work together to form a bubble of life. They interact and need each other to rise !

11. Hormones : are substances produced by the body and transferred by blood. They contribute throughout life influencing our growth, reproduction, body functioning, muscles developing, sleep and moods...

12. Planetary boundaries : they are indicators of major environmental problems that we'll have to face. They show the limits that we should not cross. Beyond these limits, the environment may not be able to self-regulate anymore.

SEARCH AND FIND



The seed that rests



Frogs near a pond



A caterpillar being eaten



Sheep on a farm



Argueing pigeons



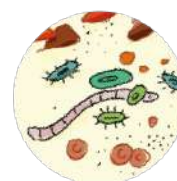
A gas station tree



Ants on a root



A grey heron watching



Bacteria and an earthworm



Bones in the ground

NAME :

SURNAME :



WATER FAMILY
DU FLOCON A LA VAGUE

The Water Family « Du Flocon à la Vague » (From the Snowflake to the Wave) is an NGO. Its mission is to educate about Water, Health and living biodiversity preservation. Since 2009, the organization has been developing comprehensive educational programmes for children at school, adults at work and all publics through open-events. All with a positive educational approach and a promotion of good practices!

THE WORLD IS CHANGING SO LET'S ADAPT TODAY : LET'S ACT TOGETHER AT THE SOURCE !



+ 35 000
young people and families
are seen in class
and on our events
every year



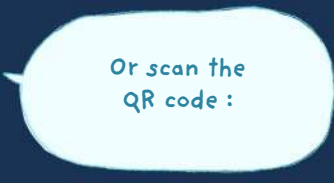
+ 250 000
educational materials
are distributed and
downloaded
every year



+ 30 000
baby trees have been distributed
since 2018 thanks to the Tree at
School programme :
programme-larbrealecole.org

To discover other downloadable tools for free,
go to our
educational platform :

waterfamily.org



We thank all our partners who believe in education for water conservation and ecology as a scientific subject. Mutual assistance between public and private actors is essential ! It allowed us to carry out this project which will be read by more than 200,000 young people in France and abroad.



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