CONCLUSION

This booklet helps you to identify the natural hazards, disasters and risks related to climate change that may occur around you. By exploring the various solutions available, we can protect ourselves today against natural hazards and above all, exploit the lessons learnt in the past.

The next booklet will concentrate on the consequences and impacts of risk on health and the environment. We will also see that there are several ways of preparing for and preventing a disaster. We will also analyze at the need to raise public awareness, which is one of the key factors in ensuring a safe future.

Wildfire

Avalanche

Coastal erosion

Flood

Landslide

Storm

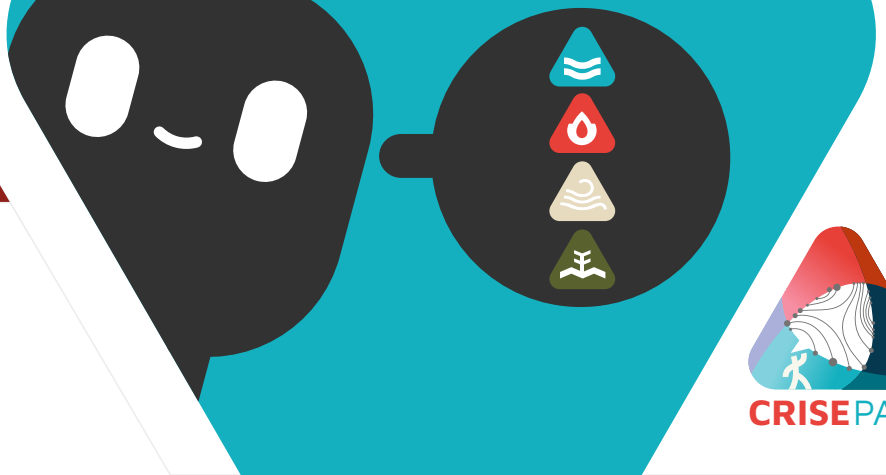
Find the correction of the booklet online : https://www.crisepac.eu/ ... in the pedagogical tools section !

Name

Surname

Date

NATURAL RISKS



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CRISEPAC

Editorial

Scientists agree that natural hazards will become more regular and intense as a result of climate change. The consequences for human society will be catastrophic, especially as exposure to risk is increasing rapidly. It has therefore become essential to understand what a natural risk is so that we can prepare for the future.

The CRISEPAC project aims to support and train teaching and education professionals in the natural risks related to climate change. 5 European partners have worked together to create teaching resources to share knowledge of risk with young people, including a website, a MOOC and a bank of teaching tools.

This booklet introduces the concepts of risk, hazard and disaster, and the connection with climate change. We will also learn that human activities amplify and aggravate disasters through unadapted practices or developments. Then, we will look at the importance of collective memory of tragic events and what solutions can be found to limit the impact of disasters on our environment and our lives.

This booklet provides teachers and education professionals with fun and educational tool to accompany lessons or to raise awareness among young people.

NATURAL RISK VOCABULARY

Fill in the crossword with the words defined below

1 > Long-term climate variation depending on temperatures, seasons and weather.

2 > Existing in or derived from nature and not made by humankind.

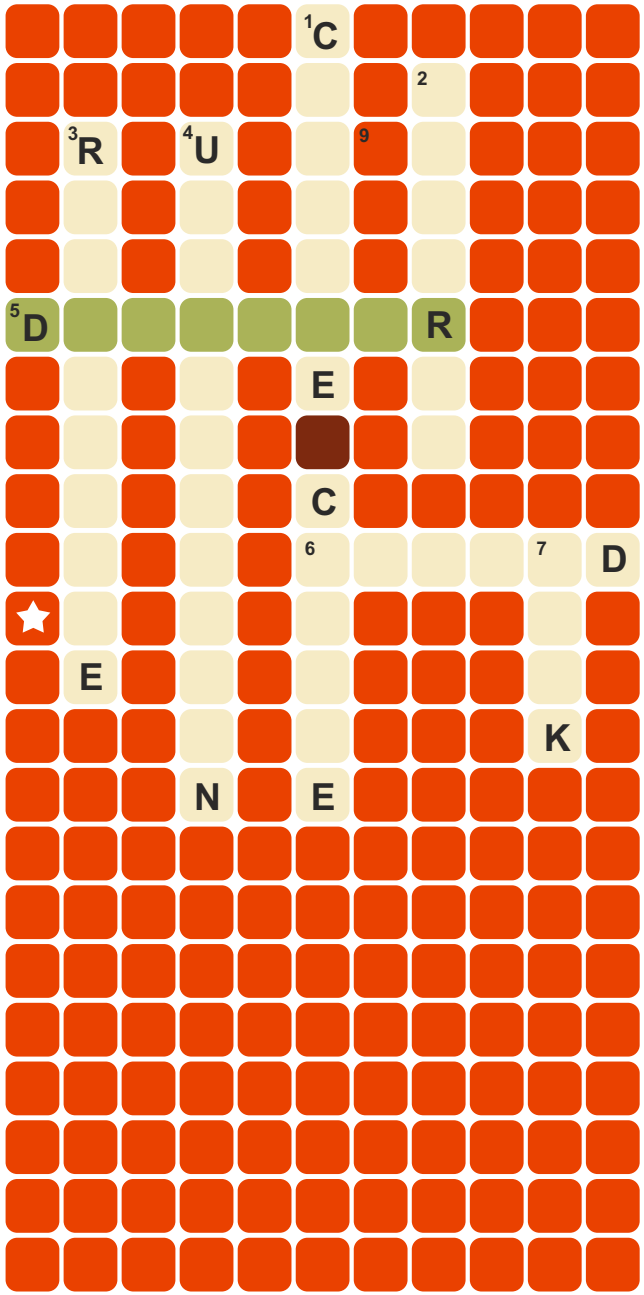
3 > Ability to recover quickly from difficulties. For instance, a house that resists an earthquake thanks to the movement of the walls during the quake.

4 > Action of developing, transforming into an urban area as a city or a town.

5 > Sudden or intense phenomena of human or natural origin with serious consequences.

6 > Possibility or probability of an event considered as harmful or damaging.

7 > Possible danger that is more or less predictable. This outcome can have a negative effect on people, the city or the environment.



NATURAL RISKS IN EUROPE

Link the pictogram to the correct riddle

A I spread it over a forest area. I can be of natural or human origin or even controlled or stopped.

I am ..... ☐

B I arrive from the sky and can do a lot of damage. I am a temporary submergence.

I am ..... ☐

C I am a violent atmospheric phenomenon made up of cloud masses. Generally moving from West to East and speeds of several tens of kilometers per hour. I am sometimes accompanied by thunderstorms, hail and tornadoes.

I am ..... ☐

D I am a phenomenon of seismic, geological or geophysical origin. I am a mass of earth that breaks away and descends a slope.

I am ..... ☐

E I follow a gradual loss of sediment along the coastline and causes the coastline to retreat inland.

I am ..... ☐

F I am following the fall of a mass of snow as it detaches itself from the mountain and slides down a slope towards the valley.

I am ..... ☐

NATURAL RISKS AND CLIMATE CHANGE

Why are climate change and natural risks related?

Fill the blank with the following words:

faster - human - long - heat - fossil - temperatures - livestock- forests

The term climate change refers to variations in ..... and weather conditions on the ..... term. These variations may be natural but since the early 19th century they have been caused mainly by ..... activities. The use of ..... fuels (such as coal, oil and gas) produce greenhouse gases in particular. These gases act like a mantle around the Earth and hold back the ..... of the sun. Today, the Earth is warming ..... than ever.

Examples of causes of the increase in gas emissions:

> The logging of ..... (deforestation) : Trees help regulate the climate by absorbing carbon dioxide (CO^2) from the sky. When a tree is cut down, CO^2 is released into the sky, increasing the mantle around the Earth.

> The increase in..... : Farm animals such as cows and sheep produce large quantities of methane when they digest their food. This gas is a part of greenhouse gases.

> Certain gases also called fluorinated gases are emitted by equipment and products as refrigerators, air conditioning or aerosols. These emissions have a considerable warming effect more than CO^2.

NATURAL RISKS AND CLIMATE CHANGE

Check the correct answer.
There are one or several possible answers.

01 A natural risk is :

- [ ] a) A phenomenon caused by human activities
- [ ] b) A probability of danger for human activities caused by a natural event
- [ ] c) A human phenomenon representing a danger to nature
- [ ] d) A natural event that harms human health and environment

02 Floods will become more and more frequent because :

- [ ] a) Rising temperatures increase the risk of precipitation: the warmer the air is, the more water vapor it contains which will potentially turn into intense showers
- [ ] b) Waste falling into the water increases the water level and river overflow
- [ ] c) Waterproofing[1] the soil makes it very difficult for water to infiltrate
- [ ] d) Under the effect of the heat the water swells and the rivers overflow

[1] We call "waterproof" a surface that leaves little or no opportunity for water to infiltrate.

03 Forest fires are becoming more and more intense due to :

- [ ] a) Some regions are going to be more affected the global warming because of the reduction in precipitation during the summer season
- [ ] b) The growing population of pyromaniac (person who likes fire)
- [ ] c) Higher temperatures favoring plant transpiration and a reduction in water content in the soil. The vegetation dries out and becomes more susceptible to fire
- [ ] d) The increase in misinformed campers

04 For a fire to start, it is essential to bring together three ingredients :

- [ ] a) A fuel[2] , an oxidant and an activation energy
- [ ] b) Grasses, fresh water and dry soil
- [ ] c) Fuel, wood and wind
- [ ] d) An oxidizer, activation energy and carbonated water

[2] Combustible : Which has the property of burning.

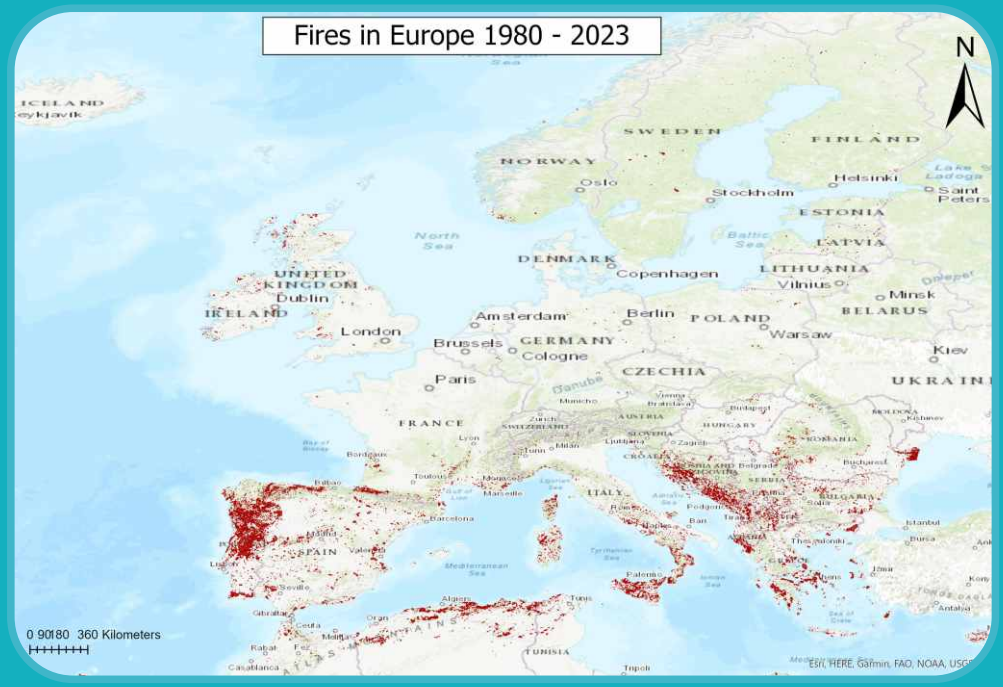
05 Zombie fires are :

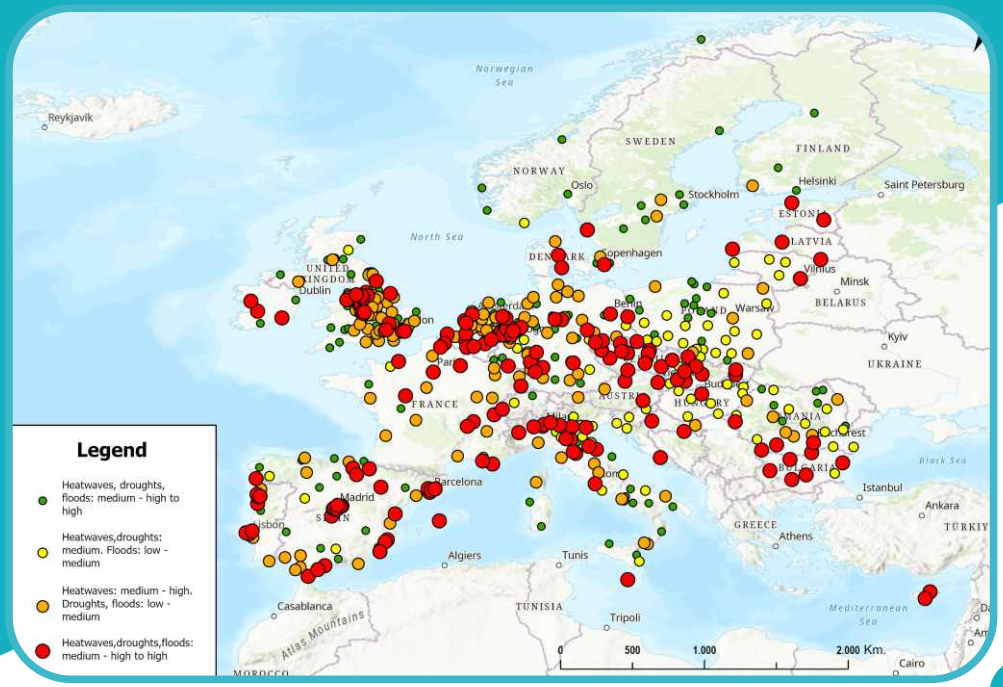
- [ ] a) Fires that only occur at night
- [ ] b) Fires that go underground and whose flames spread through decomposing roots
- [ ] c) Dead wood fires
- [ ] d) Small flames of the top of the trees

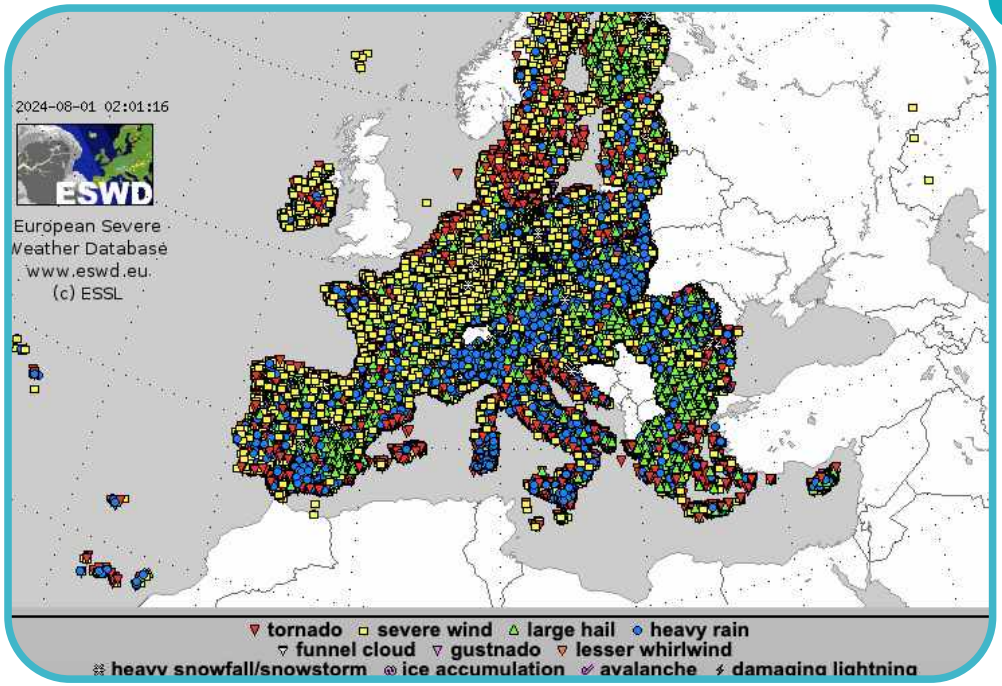
Have you or your relatives experienced a natural disaster?

If you have, write your story below

WHAT'S HAPPENING IN EUROPE







PRACTICES THAT INCREASE RISK

Certain human activities or practices can aggravate the natural risk and therefore increase the damage.
Read the text below to continue the exercise.

A **dam failure** occurs when the structure cracks due to natural events (earthquake, landslide, flood...) or human failures (negligence, sabotage...). This rupture results in the uncontrolled discharge of water or mud contained by the dam. This type of disaster remains uncommon but each event causes serious human, environmental and material consequences.

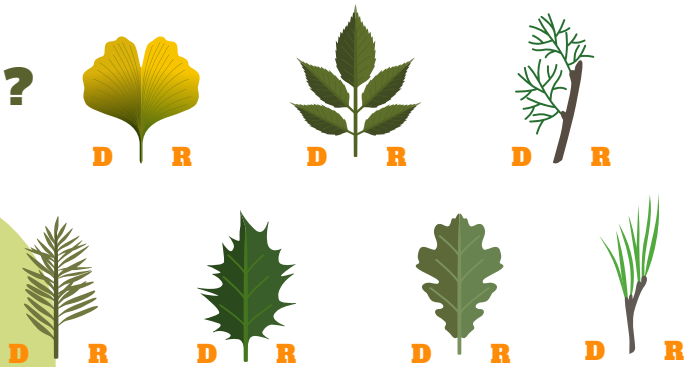
Growing pine trees makes it easier for fires to spread. The pine trees are also called resinous trees that are extremely flammable. However, if they were mixed with different trees, the fire would go slower, because of the humidity in the forest.

Example : Canary Islands have been touched by intense droughts for several decades. The fire which destroyed 10% of the island of Gomera in 2012 stopped at the gates of the primary forest[3]. The presence of different trees and the large amounts of dead wood-maintained humidity there; that also blocks the wind.

As a result of this example, wildfires spread more easily in pine tree forest than in mixed forests (different kinds of trees). Same observation with the wind: mixed forests seem more resistant to storms.

Deciduous or resinous ?

Circle the initial letter :
D for deciduous
R for resinous



Soil sealing corresponds to the covering of the ground with an impermeable artificial material (tar, concrete...), that means the water or air can't pass through. This waterproofing occurs in particular during the construction of buildings, parking lots or roads and it is more important in urbanized areas such as a city. Soil sealing encourages water to run off the ground. For instance, this phenomenon drastically amplifies the risk of flooding.

3 A forest that has not been exploited or cleared by man is considered primary.

PRACTICES THAT INCREASE RISK

Put a cross inside the two eyes in the pictures that represent an aggravation of a natural risk.


Wetland


Soil waterproofing


Mixed forest

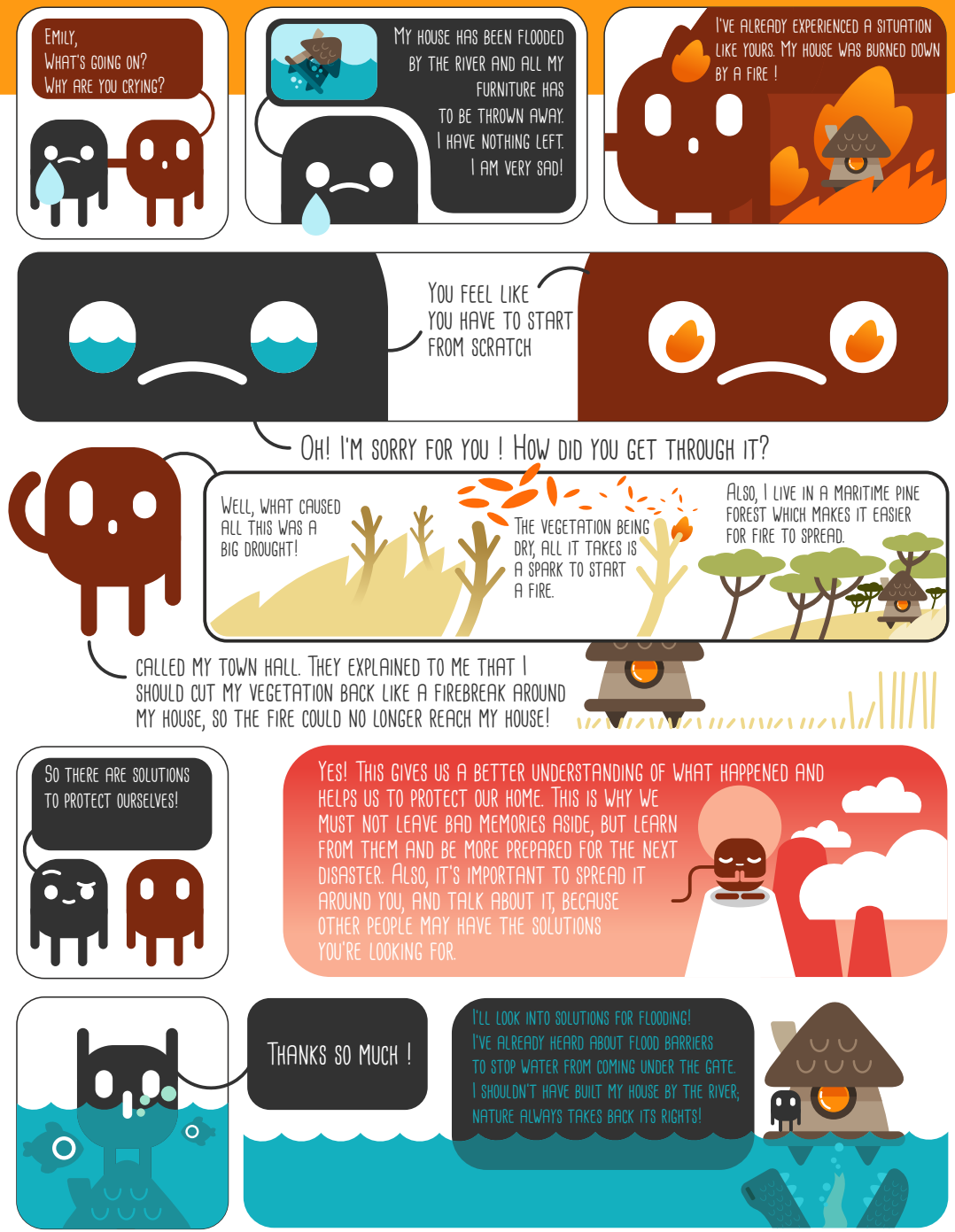

Dam


Pine forest


Swimming pool

LET'S KEEP IN MEMORY

Remembering past events and telling others about them helps us to be better prepared for similar events in the future.
Thanks to the testimonies, people who have experienced natural disasters can better protect themselves when facing a similar situation. The lessons learned can save lives and limit damage.



LET'S KEEP IN MEMORY

Questions for understanding :

A **Emily experienced a disaster, which one? and which one did Alex?**

B **How are they linked to climate change?**

C **Why does Alex tell the story of her house burning down?**

D **How can you protect your house from wildfire?**

E **What about floods from rain or river overflow? How can you protect yourself against them?**

LET'S KEEP IN MEMORY

Match the before and after images

THE RESILIENT HOUSE

This house is resilient because it can resist extreme conditions such as fire and flooding.

Circle some protective equipment with the right place in the house :
In blue when it comes to flood protection equipment,
In red when it comes to fire protection,
In green when it comes to storm protection.

Roof window :
Depending on the disaster, it is important to have an exit. The roof window can protect you if you need to go upstairs. For instance, if you go into the attic without a roof window you can get stuck without any exit.

Water tank :
Storage of water.

Lightning rod :
A metallic structure that is attached to the top of the roof and leads to the ground. It protects the house from destruction by lightning.

Installing flood barriers :
A flood barrier or floodgate is a barrier placed outside a door or French window. This barrier prevents the water from running into the house.

Installing an anti-return valve :
An anti-return valve or check valve is a valve that closes to prevent backward used water from the pipes.

No fuel against the house :
Nothing explosive close to a house where there is a high risk of wildfire.

Clearing vegetation near the house :
Cutting the vegetation back to prevent a fire and protect the house. Creating a firebreak slows down the fire expansion around the house.

A roof in good condition :
A solid roof could protect the house from a storm. For example, the terracotta tiles are very strong and resist severe weather and strong winds.

Closing the air vent :
The air vent is used in the room to let the air and humidity go. It can be opened or closed.

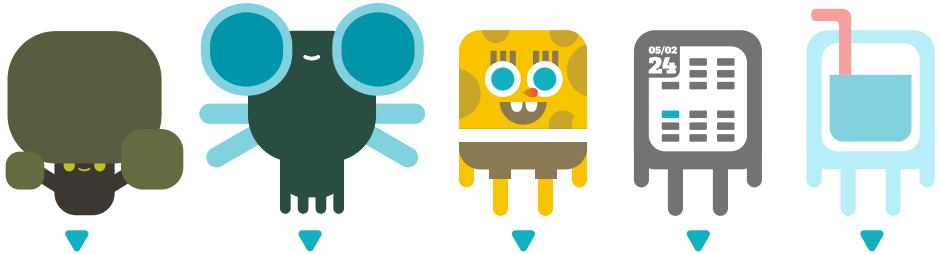
Fire extinguisher :
It is the item that serves to stop a fire. It can be mandatory in a bus or a public place like a school.

Securing the electric meter :
The electric meter controls all the electricity in your home. To be safe, it is necessary to put it in an accessible place and height to avoid any contact with the water.

/!\ This exercise is an example !
At your home that can be different, and even more if you're living in an apartment. Those are some ideas not effective to everyone and applicable to every case.

WETLAND: A SOLUTION FOR FLOODING

01 Link the images to the right sentences:



I welcome hydrophilic vegetation (plant lives in the water)

I gorge myself with water

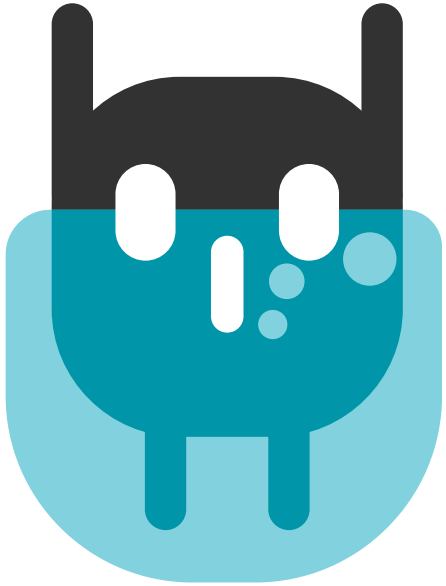
I evolve throughout the year

I fill and empty myself

I'm home to a huge range of biodiversity

02 Solve this rebus. _ _ _ _ _ _ _

03 Fill in the blanks using the definitions above and the rebus:



A.....

is land that is..... of water.

The land can fill up and .....

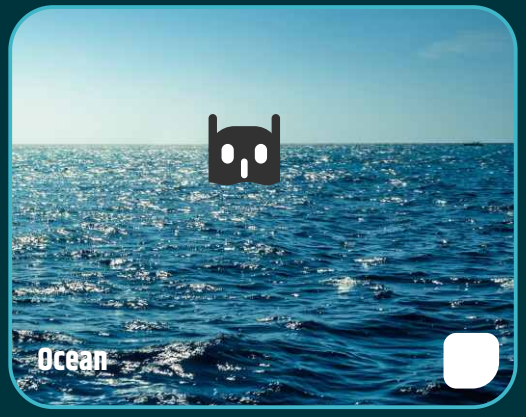
throughout.....

This environment welcomes a huge range

of..... ..... such as .....

vegetation (plant that likes water).

04 Put a cross inside the blank square in the pictures that represent a wetland



Find in the illustration different natural risk and solutions.

In this illustration, complete the legend and find :

- ✖ Natural risk by a red cross
- △ Human activities that increase the risk by a blue triangle
- ○ Solutions that protect from naturel disasters by a green circle

Complete the legend like the examples :

✖ **Natural risks :**

Landslide

△ **Human activities that increase the risk :**

Building on a wetland

○ **Solutions that protect from naturel disaster :**

Building a dyke

SOLUTIONS TO NATURAL DISASTERS

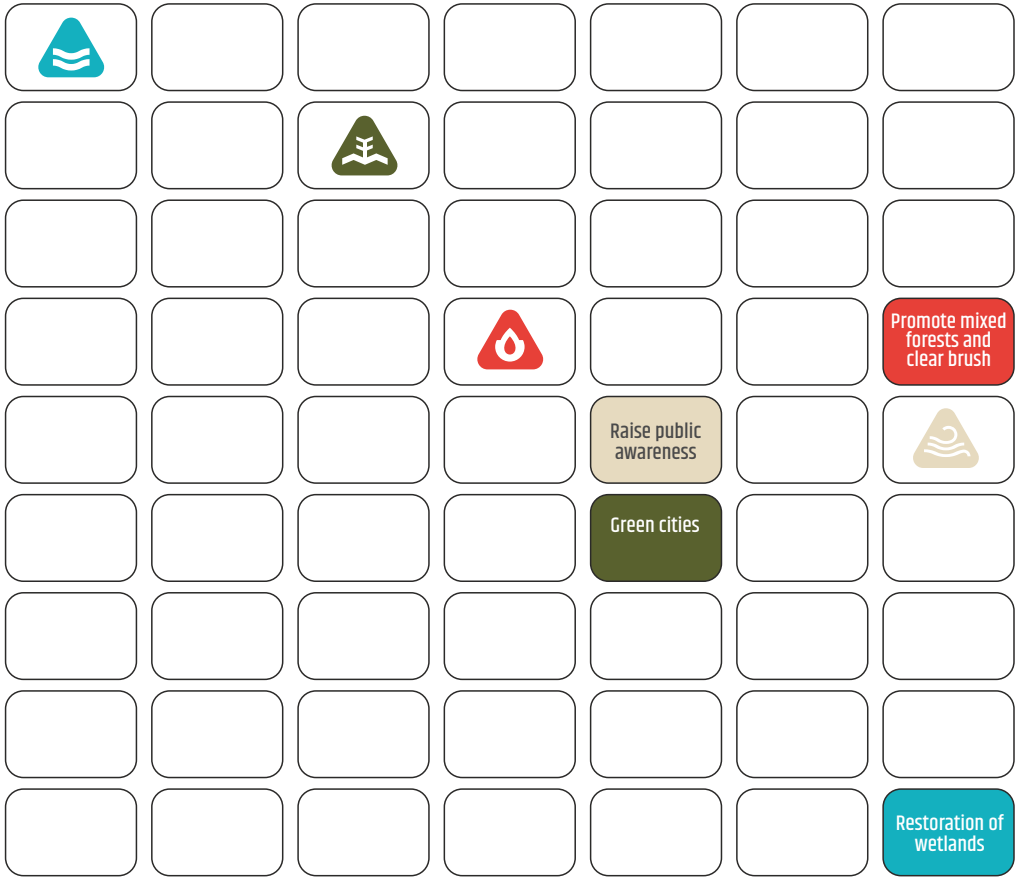
Find the path to link the risk and its solution.
Be careful, the path cannot cross !

Wildfire
(color the path in red)

Flooding
(color the path in blue)

Soil sealing
(color the path in green)

Storm
(color the path in black)



We all have a role to play in the fight against climate change and natural disaster. **Write below the actions or gestures that you can do :**