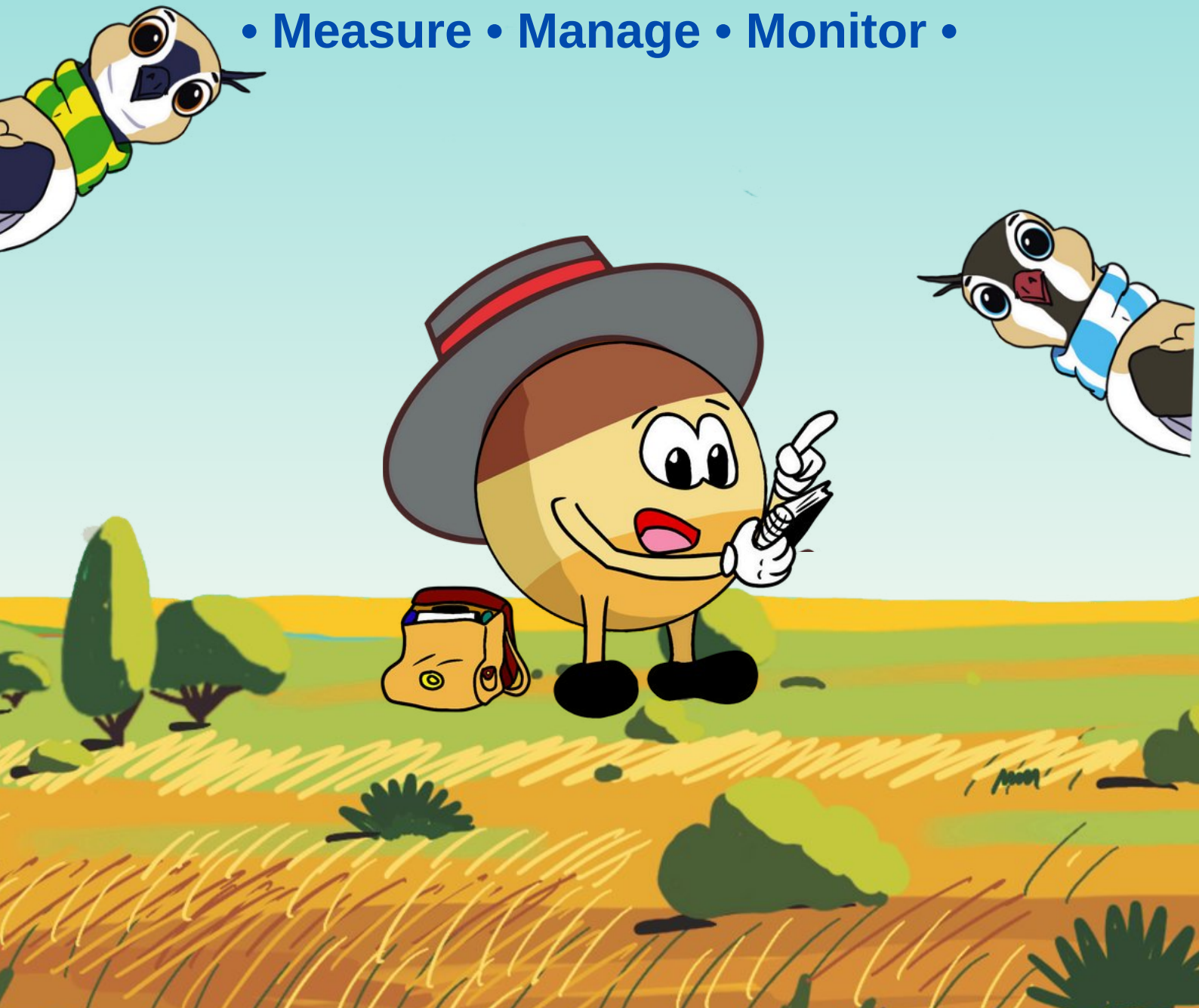
Solinho in the PAMPA

Caring for Soils:

• Measure • Manage • Monitor •



Departamento de Ciência do Solo
Programa Ponte Solo na Escola

2nd edition - Revised and Expanded

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Contents

Introduction

Solinho, our super cool adventurer, got a really special invite!
In this story, we go to the Pampa, a special place, in the Brazilian and Argentine portion of the Pampa, where real things mix with the magical adventures of Solinho!
In this adventure, Solinho and Aguinha are going to explore the Pampa! They will be helped by their two bird buddies: Tero from Argentina and Quero-Quero from Brazil. Yay! They go on a super fun adventure where they find cool things, have exciting times, and learn all about the amazing stuff in nature and life!

Source: MapBiomas

This story talks about really big things that happened, like the huge floods in Brazil in 1941 and 2024. It shows how nature can change the land and the lives of the ones who live there!

Pampa

The Pampa biome shares its territory among BRAZIL, ARGENTINA and URUGUAY.

The call

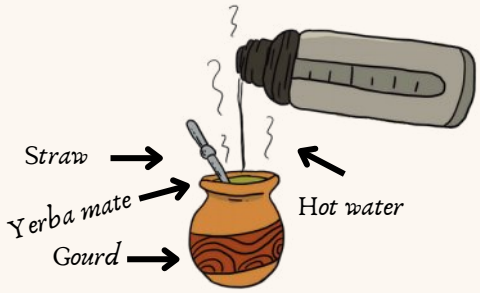
Solinho was in the big flooded plains of the Pantanal biome when he got a call from the Brazilian **QUERO-QUERO*** and the Argentine **TERO***!

* Both are sentinel birds and are often remembered for defending their territory.

Scientific name:
Vanellus chilensis

After a yummy drink of **MATE**, they talked about the cool signs that nature show us!

Did you know?



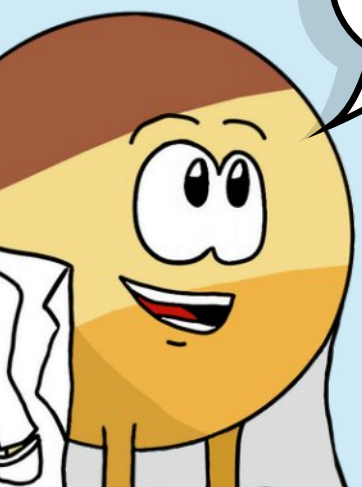
Chimarrão or Mate

Have you ever tried chimarrão (Brazil) or mate (Argentina and Uruguay), the drink that's a true symbol of Southern American culture? It's made by steeping the yerba mate plant in hot water at around 80 degrees Celsius, and drinking it through a straw. It's a unique and delicious experience!

(Scientific name: *Ilex paraguariensis)*

The nature

Aguinha, when mentioned, came closer.

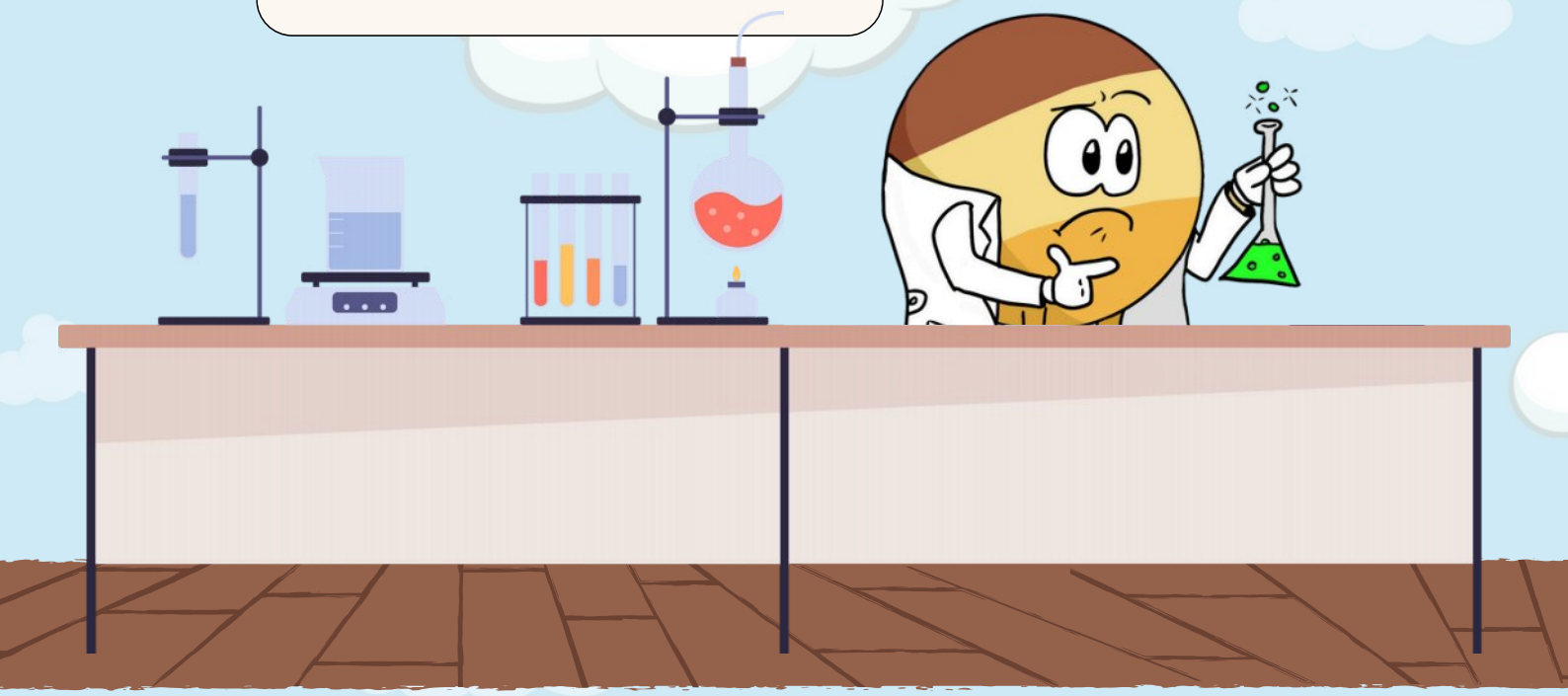


Infiltration

The importance of measuring

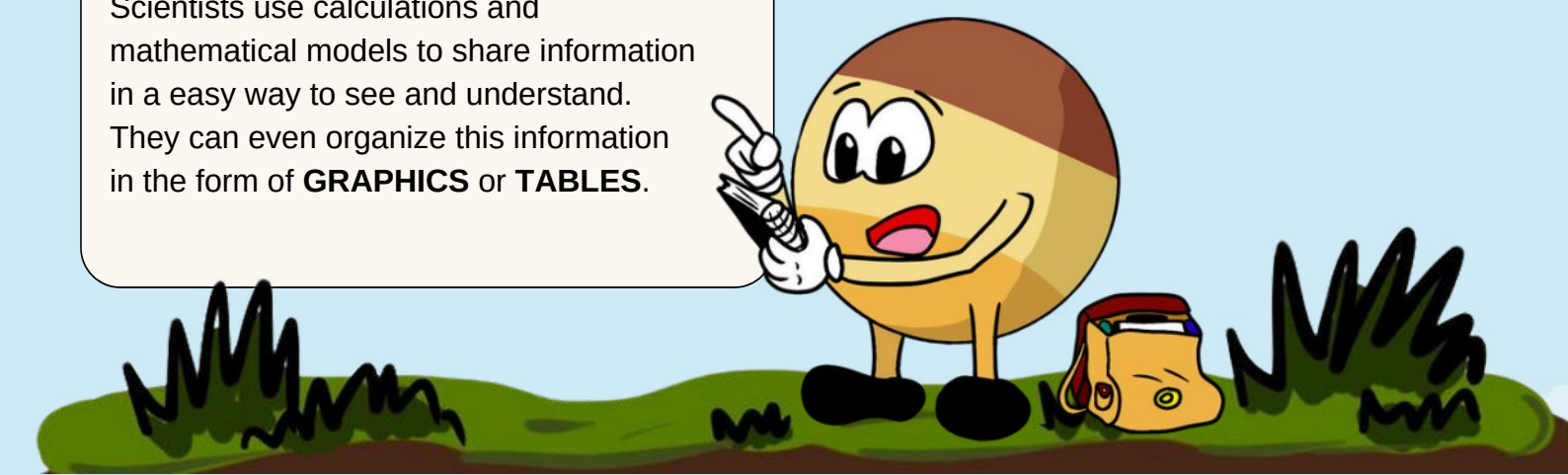
What are data?

DATA are all those records that a scientist gathers on their experiment or research, which can be sampled in form of text, number, audio, image, and much more!



How do we interpret the data?

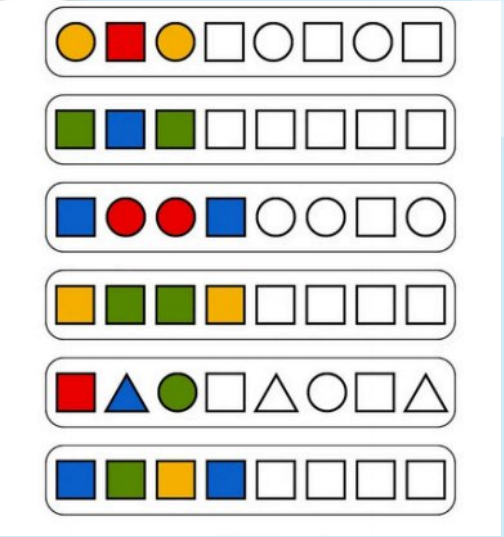
Scientists use calculations and mathematical models to share information in a easy way to see and understand. They can even organize this information in the form of **GRAPHICS** or **TABLES**.



Importance of science in obtaining data

Thanks to all the historical data we have, we can start to predict what will happen next!

I'd love to see if you can **PREDICT** the colors that follow each sequence in the picture here!

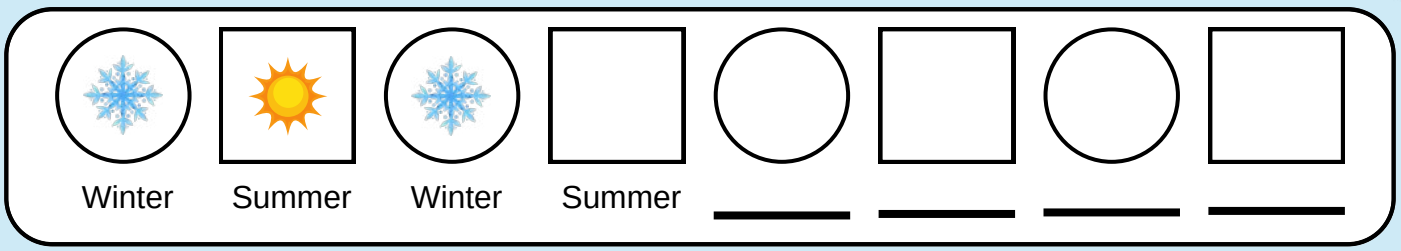


The solution can be found on page 21

Source: www.educlub.com.br

Weather forecast

It's absolutely fantastic to see how **SCIENCE** is making such an impact and has been able to forecast the weather based on the data collected! You can try in the picture below!



The solution can be found on page 21

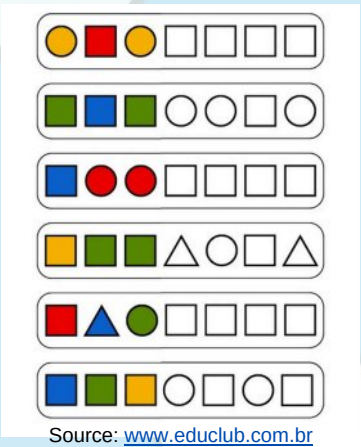
Measuring data in the Pampa biome

The **MapBiomas Pampa**, a collaborative network of experts from Argentina, Brazil, and Uruguay, have been working hard on innovative soil data collection and analyzing **SATELLITE IMAGES** to learn more about how land is used in the South American Pampa Biome.

But Quero-Quero and Tero were super worried because it was the rainy season and it had been a long time since it rained.

Climate change

The solution can be found on page 21

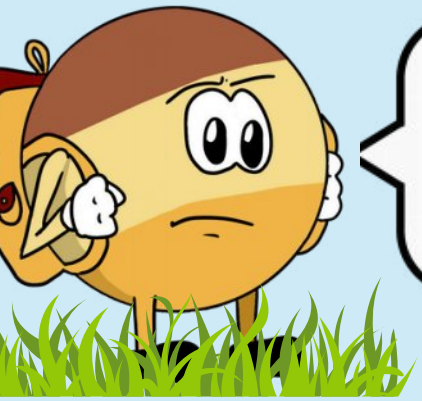


Source: www.educlub.com.br

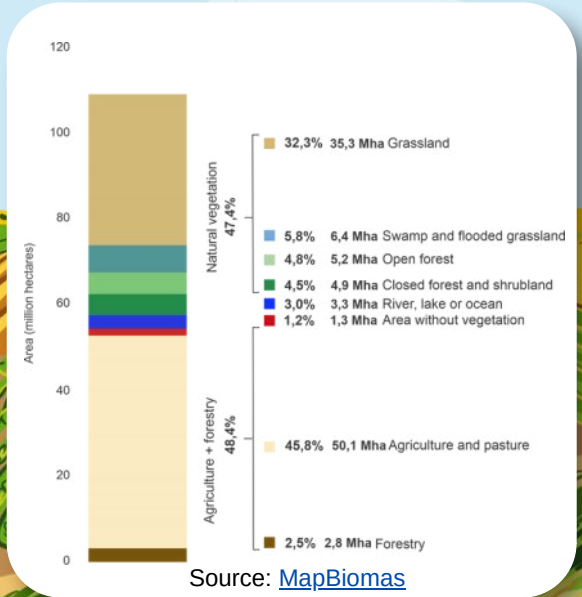
Why...

...is the weather becoming really tricky to predict??

That's because...



...some of our own human actions, such as using fossil fuels, burning, and deforestation, have caused **CLIMATE CHANGE**.



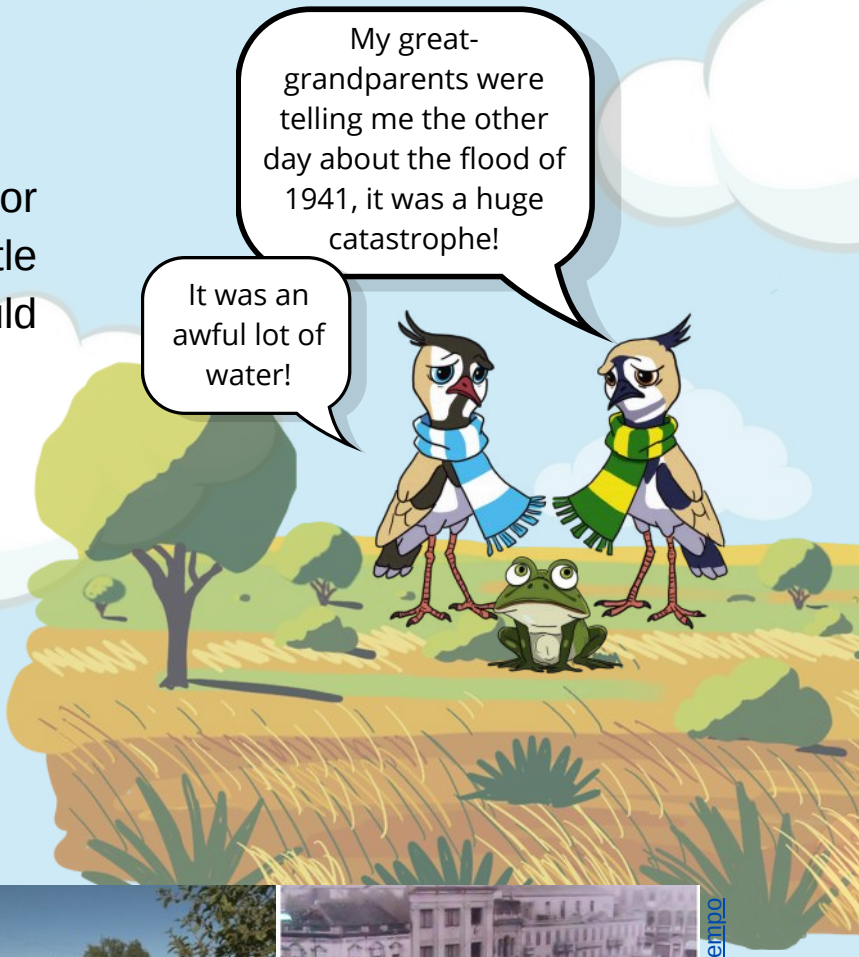
Source: MapBiomas

The MapBiomas Pampa found that **NATIVE VEGETATION** currently covers less than half of the Pampa (47.4%).

The loss of native plant life in the Pampa is the main reason this biome is becoming less resilient, leaving it **VULNERABLE** to rain.

What does the past tell us?

They were really hoping for rain, but they were also a little bit scared about how it would come.

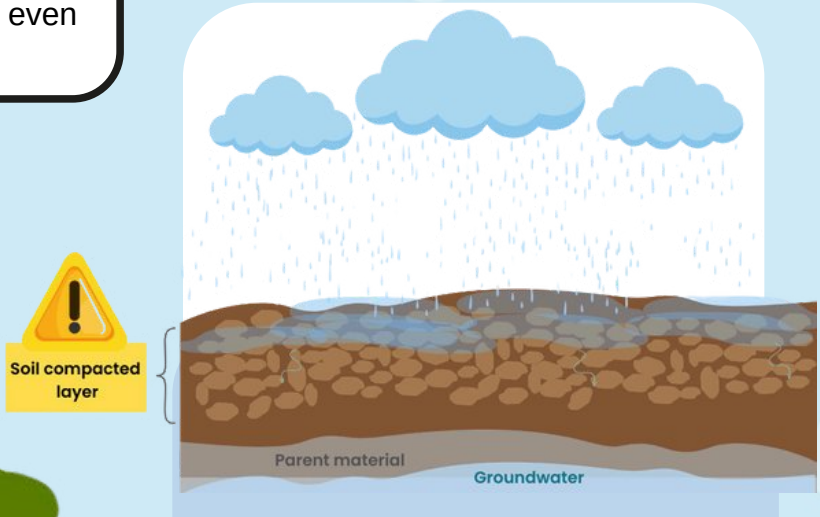


This photo was took in 1941 and shows the flooding near the Jacuí River. Next to it, the same location recorded today, with the river appearing in the background.

Source: Novo Tempo

Porto Alegre also suffered from the flood of 1941. Boats were used where other transport previously passed.

Runoff



And the rain came!

A few weeks later...

Suddenly, a song started playing.
Sapo the frog was saying that the rain is coming!

Wow! As predicted, it was quite a downpour, even more intense than the big rain in 1941.

Aguinha was feeling really sad because there was **TOO MUCH RAIN** and asphalt everywhere.

The water started to flow super fast, sweeping everything in its path away, and spreading to make flash floods all over the place!

Flood and its consequences

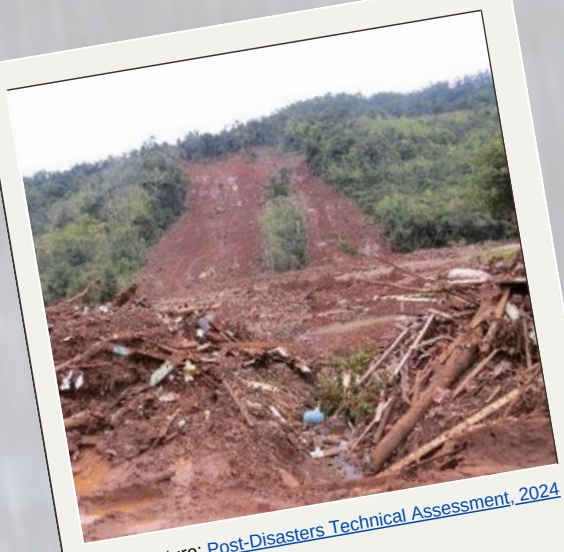


Photo capture: Post-Disasters Technical Assessment, 2024

The flood caused big **LANDSLIDES**.

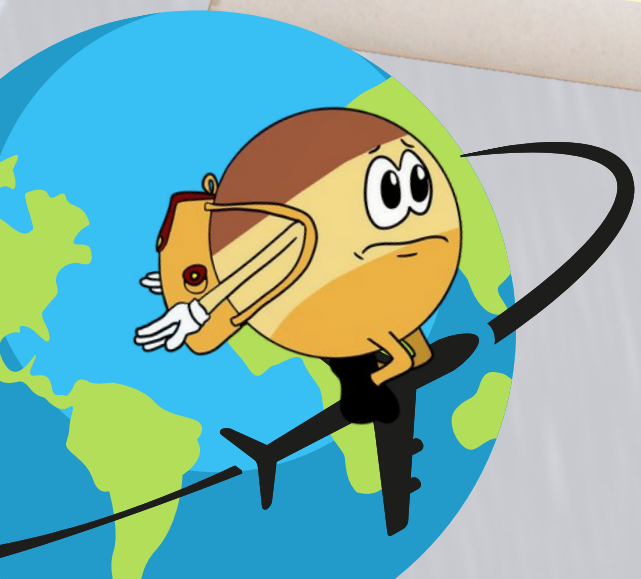
NEWS AROUND THE WORLD

2.7 million hectares of land lost fertility due to soil erosion after flooding

Source: G1, 2024

Sediment stain from the Patos Lagoon reaches the ocean; see new satellite images

Photo capture: G1, 2024



Examples of floods in the world

Solinho traveled all around the **GLOBE**, observing many other places facing similar flooding challenges.

What can we do after the flood?

After the flood, the poor animals of the Pampa were so discouraged!

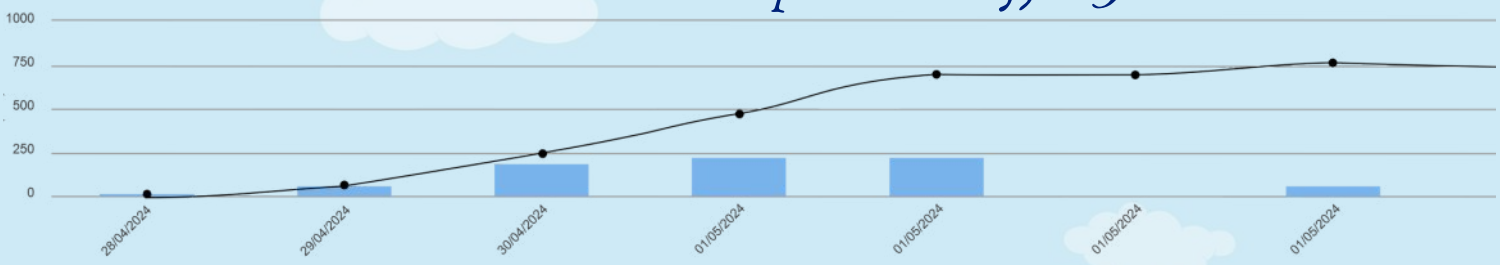
THE NEWS

Rio Grande do Sul will take **8 thousand years** to recover the fertility of soils destroyed by floods

Source: Correio do Povo, 2024

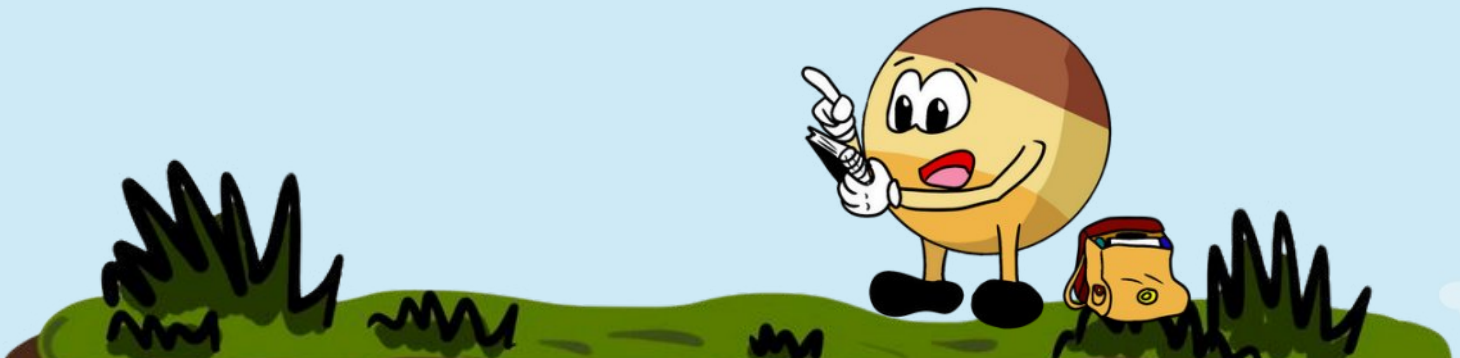
When Solinho got back from his super cool scientific adventure, he started to ANALYZE the flood data to find solutions.

Accumulated Precipitation in 35 days



Source: Post-Disasters Technical Assessment, 2024

Station: Centro (430830001A)



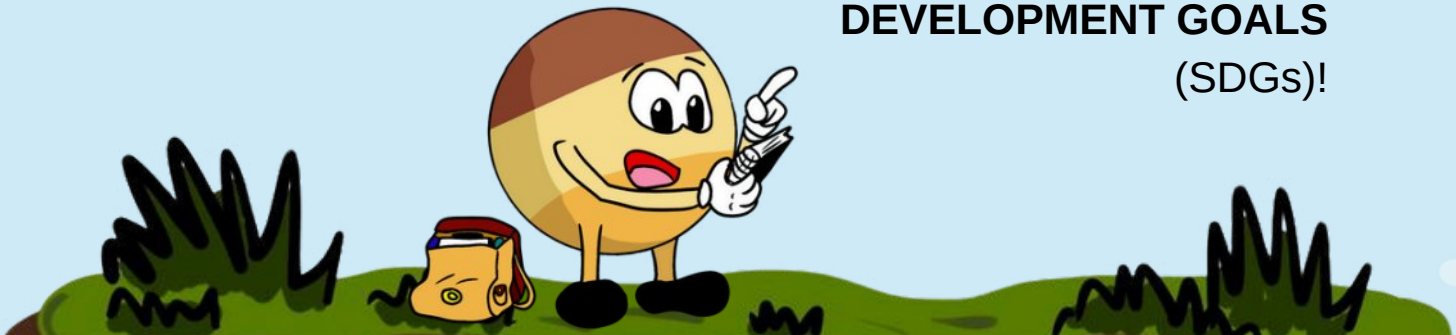
Sustainable Development Goals

Solinho was on a mission to find solutions to the problem. That's when he came across the **SUSTAINABLE DEVELOPMENT GOALS**, or SDGs.

Do you know what the sustainable development goals are?

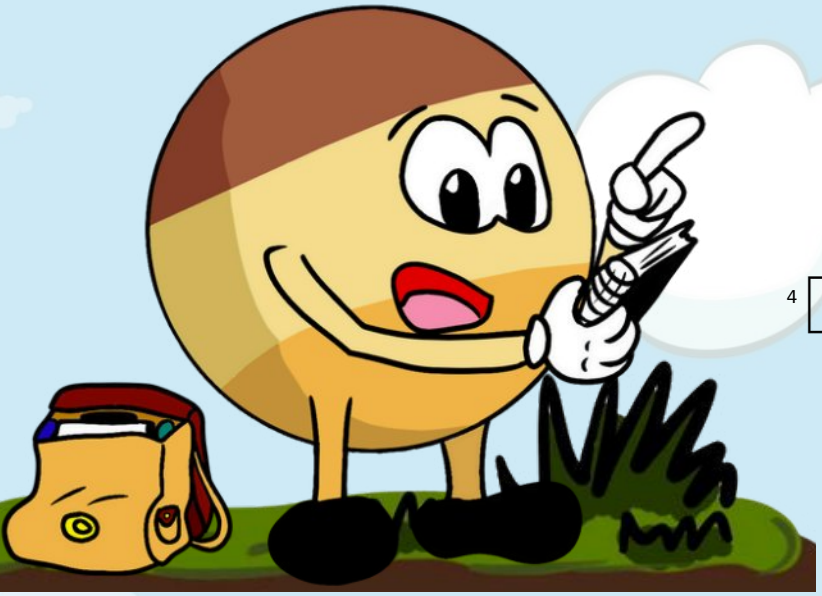
Source: https://sdgs.un.org/

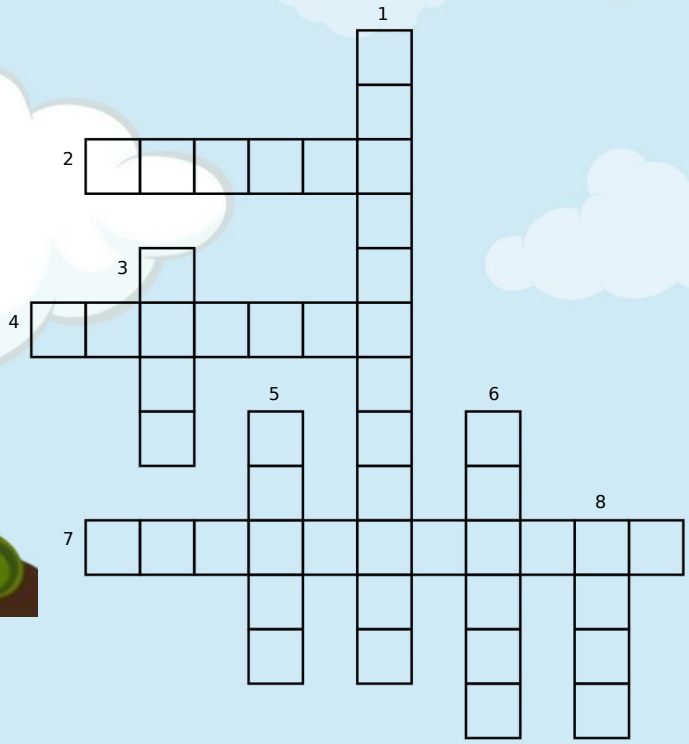
In 2015, the United Nations (UN) launched the 2030 Agenda, when 193 countries agreed to achieve 17 **SUSTAINABLE DEVELOPMENT GOALS** (SDGs)!



Crossword

Solinho made some reflections and highlighted some points about **SDG** and **FLOODS**.





Down

1. **SDG 17**. _____ for the goals. Some biomes, such as the Pampa, share their biodiversity among different countries, such as Brazil, Argentina and Uruguay, and the actions of one country can affect another. Therefore, it is necessary to join forces to maintain the different biomes due to global actions.
3. **SDG 14**. ____ below water. Many organisms depend on water to live, such as frogs.
5. **SDG 6**. Clean _____ and sanitation. Proper water management, ensuring that it infiltrates the soil, will ensure that the water is of good quality.
6. **SDG 3**. Good _____ and well-being. If we live in a sustainable city, we will not need to worry about floods and will be able to live peacefully.
8. **SDG 15**. Life on ____. Many organisms depend on soil to live, such as plants.

Across

2. **SDG 2**. Zero _____. If we avoid the loss of soil fertility and ensure sustainable food production, we will not have problems with hunger.
4. **SDG 13**. _____ action. Society needs to be aware of its actions so that they do not intensify natural climate phenomena.
7. **SDG 11**. _____ cities and communities. When cities are planned, flooding events can be prevented to happen.

The solution can be found on page 21.

The importance of management

Nature-Based Solutions

Then Solinho took a moment to appreciate the Pampa view, and saw how the water was gradually making its way back into the soil. It gave him super cool ideas about how to **MANAGE** the soil.

Sponge City

Let's manage the soil

- To preserve the Pampa native areas
- To apply soil conservation practices
- To improve the rain infiltration into the soil

The importance of monitoring

Let's check how we are doing!

Let's monitor the soil

- To keep measuring the weather data
- To keep measuring the soil health

Solinho and Aguinha were aware that management alone is not sufficient. It is super important to **MONITOR** the practices in order to help guide and maintain actions.

Yeah! We can do it!

Solinho, saw João-de-Barro, the rufous hornero, building his house again after the flood, was inspired by his example of **RESILIENCE** and encourages everyone else to rebuild the Pampa too.

The João-de-barro (Rufous Hornero, in English) contructs his own nest using moist clay, manure and straw as raw materials. The proportions of which depend on the type of soil (if sandy, the amount of manure can be greater than that of soil). The construction of the nest takes between 18 days and 1 month, depending on the existence of rain and the abundance of clay.

Scientific name: *Furnarius rufus*

Source: G1, 2022

Puzzle

Sometimes we face strong winds or obstacles, but just like João-de-Barro, we have to keep going, believing in what we want and that we can make our dreams come true.

Iza Lira

Thus, based on soil and rainfall measurements, soil management and weather monitoring, flooding has not become a problem for the Pampa anymore!

Solutions

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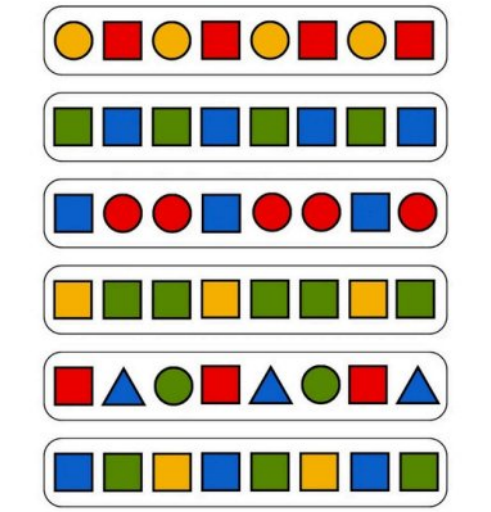

Source: www.educlub.com.br

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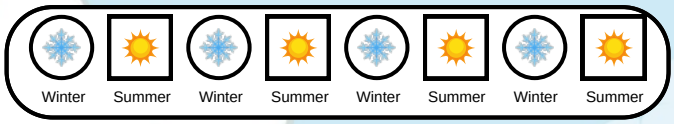

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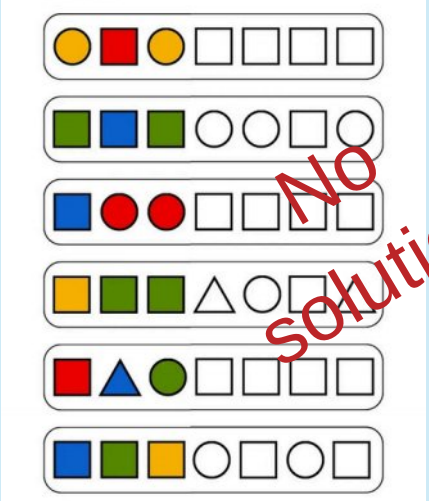

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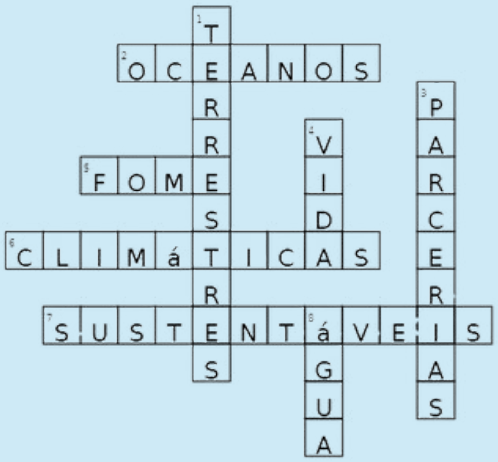

The End