Memories of Silt: The Science of Floods in Portugal

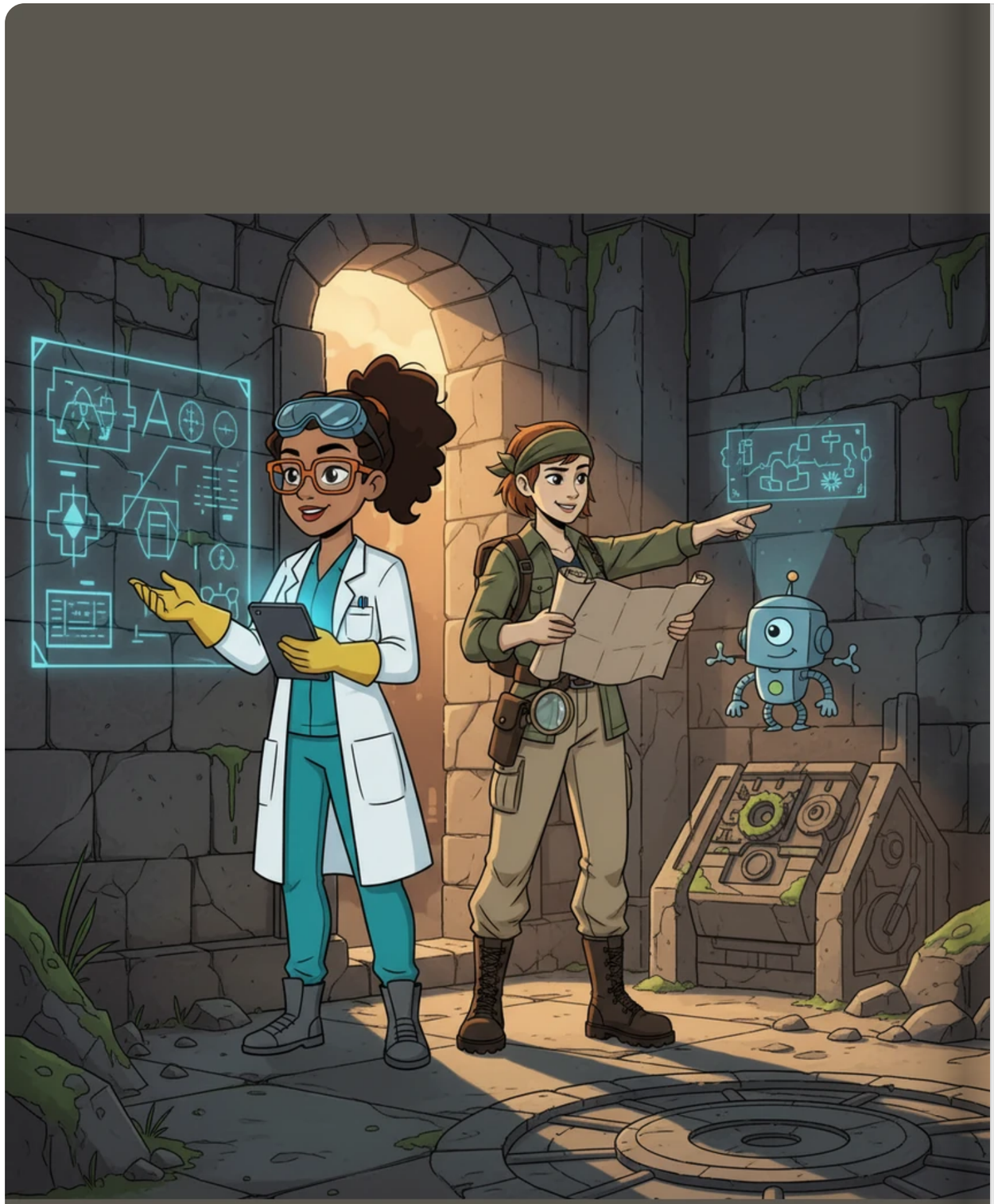
Bianca Sousa

Jéssica and Bianca examine a large, detailed map of Portugal, focusing on the blue-shaded high-risk zones around the Tagus and Douro estuaries. They are starting a research project to understand the science and history of the country's most devastating floods.

The girls look back at the tragedy of 1967, where a massive storm dropped a fifth of the year's rain on Lisbon in just five hours. They learn about convective rain, a phenomenon where warm, moist air rises rapidly and condenses into a violent, overwhelming downpour.

Standing by the Tagus River in Vila Franca de Xira, Bianca watches the powerful current while Jéssica explains that most of the river's water comes from Spain. They discuss how dams across the Iberian Peninsula must coordinate their gates to manage the peak flow of the international basin.

In a paved urban area, Bianca notices that the water has nowhere to go, while Jéssica explains the danger of soil impermeabilization. They learn that while natural forests absorb half of all rainfall, city asphalt allows almost all of it to flow over the surface as dangerous runoff.



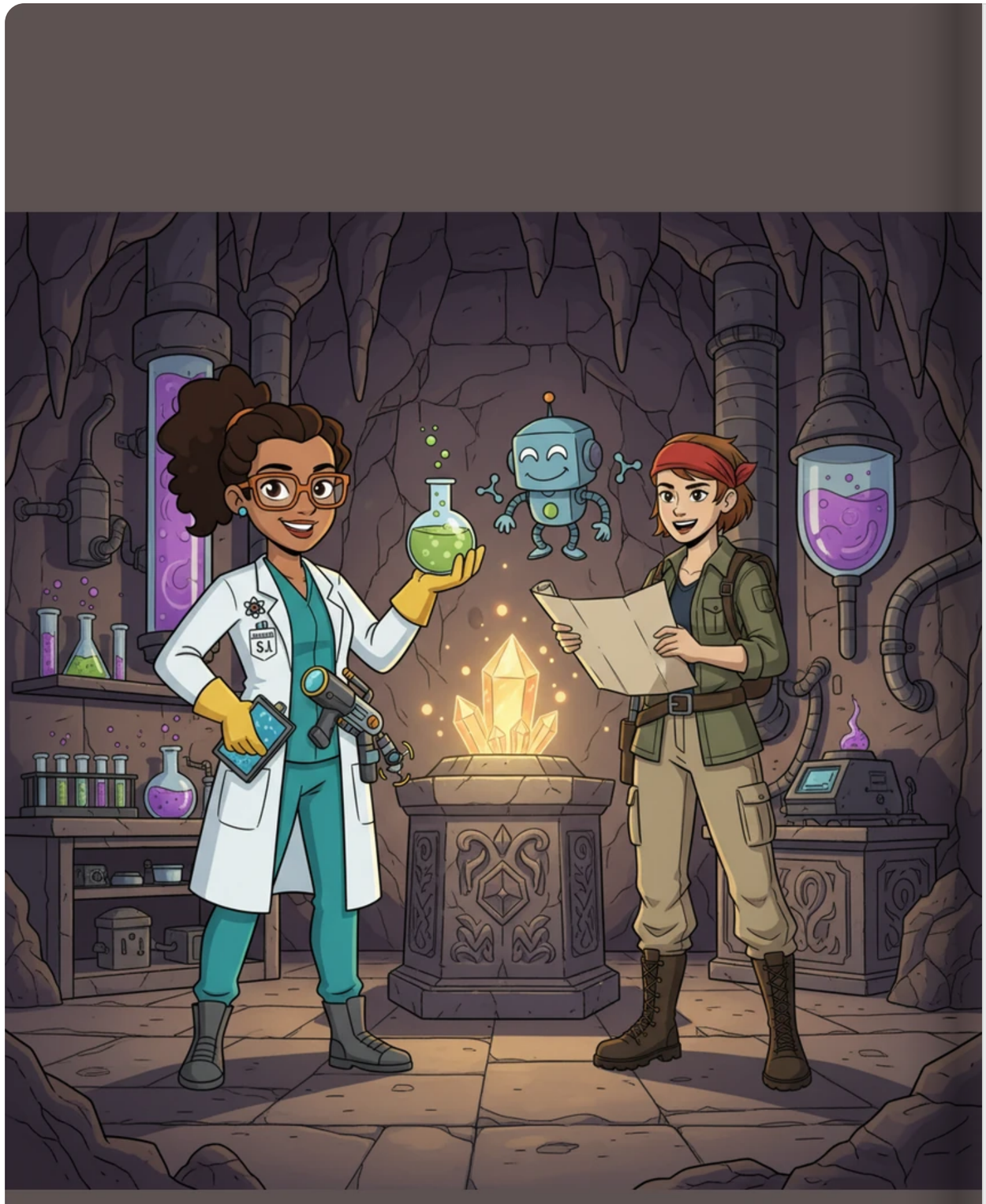
The friends study the 2010 Madeira floods, where the steep mountain slopes turned heavy rain into a fast-moving wall of mud and rocks. They realize how the island's unique geography gave the water devastating kinetic energy as it rushed down toward the city of Funchal.

Jéssica shows Bianca photographs of Lisbon's downtown completely submerged during the extreme rainfall of December 2022. They see how the city's old drainage system, built for a different century, was simply overwhelmed by the modern intensity of the storms.

Using a scientific chart, Jéssica explains the 'wet bomb' effect caused by climate change, where a warmer atmosphere holds more moisture. They discuss how this leads to flash floods, where an entire month's worth of rain can fall in just sixty minutes.

At a monitoring station, the girls see how the Portuguese Environment Agency uses the SNIRH system to track river levels in real time. This scientific surveillance allows for early warnings that give communities the critical time needed to prepare before the water rises.

They visit a massive construction site for a new five-kilometer drainage tunnel designed to protect Lisbon's lower streets from future disasters. These giant underground channels will divert excess water from the hills directly into the river, bypassing the vulnerable city center.



Jéssica and Bianca conclude their work with a vision of 'sponge cities' that manage water naturally through better urban planning. They stand together overlooking a safe, well-planned landscape, knowing that while we cannot stop the rain, science and preparation are the keys to a safer future.