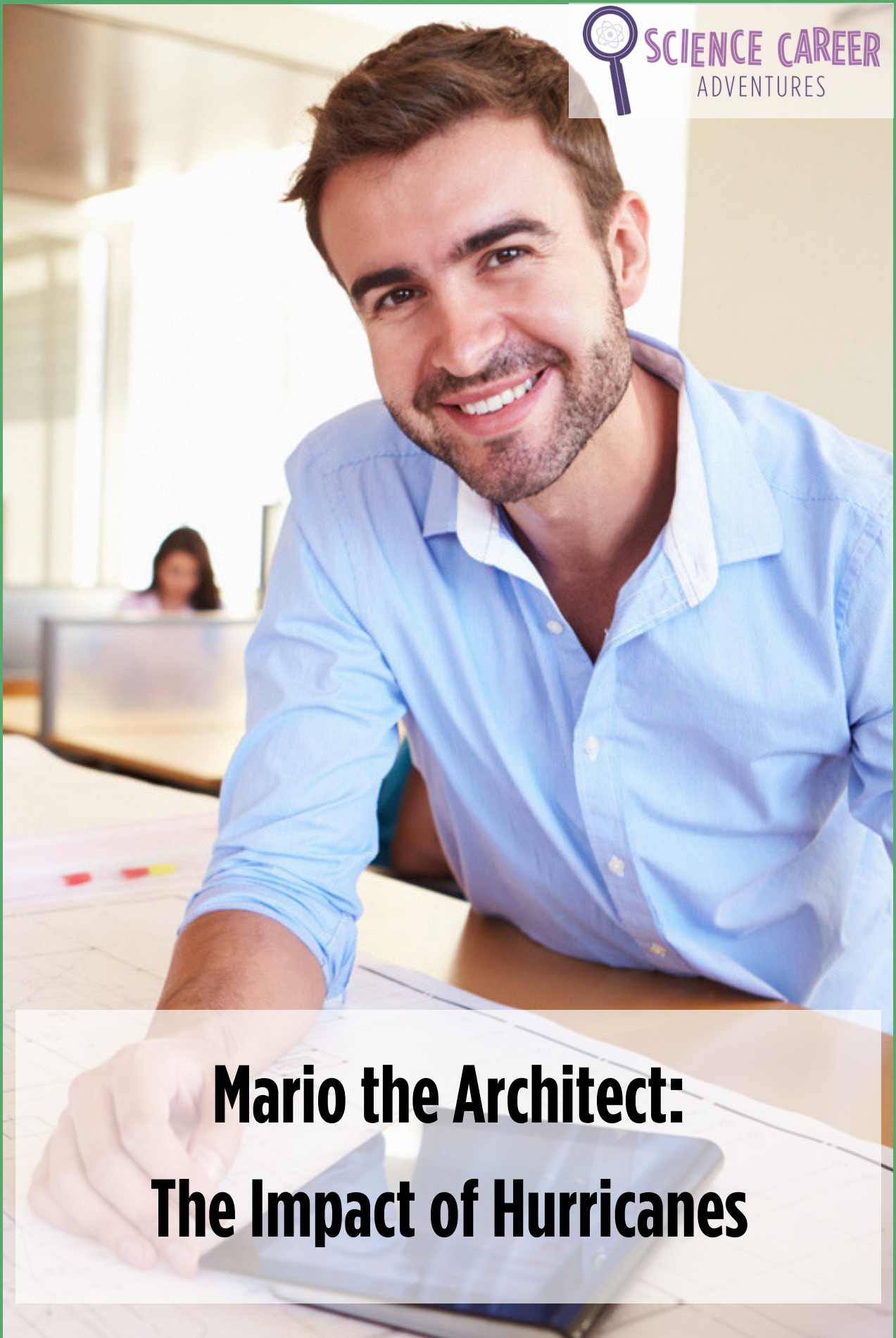




SCIENCE CAREER
ADVENTURES



Mario the Architect: The Impact of Hurricanes

Meet Mario!

Meet Mario; he's an architect. Architects design buildings and structures. Architects typically have a specialty, which means they design certain types of buildings.

For example, some architects design residential buildings, which are buildings that people live in. Other architects design commercial buildings, such as factories or hospitals.

Mario designs residential buildings. Specifically, he designs large apartment complexes where hundreds of people live.



**Did you know?
The most expensive
apartment ever sold in New
York City was for \$100
million! Would you pay that
much for an apartment?**

Working in Puerto Rico

Right now, I am rebuilding apartments in Puerto Rico. Hurricane Maria recently destroyed many apartment complexes. These buildings need to be rebuilt using stronger materials so they can withstand future hurricanes.



How a hurricane forms

Hurricanes form when the following happens:

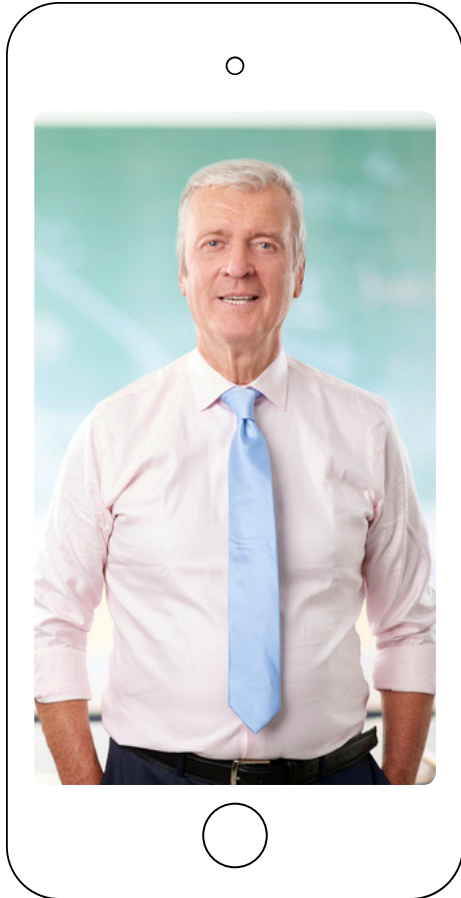
- Water molecules in the ocean start to move more quickly.
- The molecules in the ocean move so quickly that they break away from the ocean and form a gas. The gas is called water vapor. The water vapor rises into the sky.
- If the right weather conditions occur, like the temperature and high winds, the water vapor and its energy form a hurricane, making it grow bigger and stronger.

Facts about Maria

- During this hurricane, strong winds and storm surges destroyed buildings. Storm surges happen when water from the ocean floods the land during a hurricane.
- Maria is listed as the tenth strongest hurricane that has ever occurred in the Atlantic Ocean.
- Even a year after the hurricane, there are still day-long power outages across the island.
- Maria caused the worst natural disaster ever in Puerto Rico.

Background Information on Hurricanes

Before I can design new buildings in Puerto Rico, I need to understand whether a strong hurricane, like Maria, can happen again. That way, I can design a more durable building that won't get destroyed in the future.

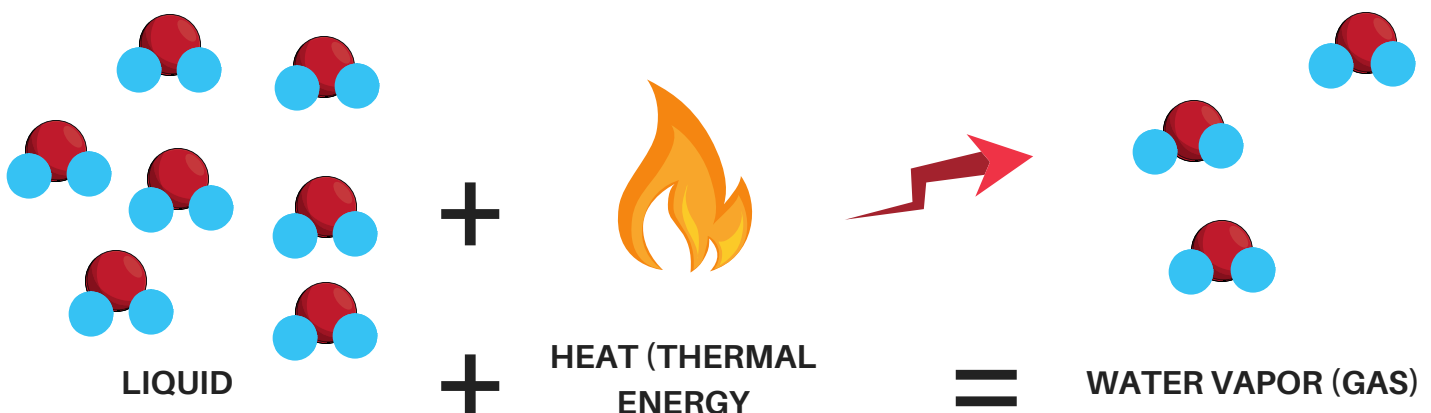


I decide to use FaceTime to video chat with John. He is a scientist that specializes in severe weather. John predicts that Puerto Rico will experience strong hurricanes again due to rising temperatures on Earth.

John explains why rising temperatures may lead to more hurricanes:

- Temperatures are increasing on Earth.
- As the temperature increases on Earth, more thermal energy is transferred to water molecules in the oceans. Thermal energy is the energy that makes something hot or cold.
- When more thermal energy is transferred to water molecules, ocean water heats up and the molecules move faster.
- When the molecules move faster, they turn into water vapor. More water vapor is created, which brings more water and thermal energy up into the sky. When this happens, hurricanes get larger and have more energy to destroy buildings.

John sends me a model he created to help me understand how increased thermal energy can lead to hurricanes.



Making A Plan

I understand that even stronger hurricanes will probably happen in the future. I now need to make a plan to rebuild the apartments. Here is my plan:

Step 1: Collect Data



Have people in Puerto Rico fill out an online form about what happened to their apartment during Hurricane Maria.

Example questions can be:

- Were windows broken?
- Did walls fall down?
- Was your building flooded?
- Did your electricity stop working?

Step 2: Sketch Design



Sketch what the apartment complex will look like. My sketch will include:

- Windows with “hurricane” shutters. Hurricane shutters are strong boards that people can use to cover the windows so they don’t break.
- The sketch will also include apartment buildings built on an elevated surface. That way, storm surges won't reach the part of the building where people live.

One of the most vulnerable areas of a house during a hurricane is the windows. These aluminum shutters can be easily moved on and off to keep people in the apartments safe.



Making A Plan (Cont'd.)

Step 3: Build a Model



Build a model of the apartment complex. A model is a small, 3-dimensional building that will show what the building will look like once it is built, and that will have a list of all its features.

Step 4: Get feedback



Get feedback on the model from other architects and make any necessary changes.

Step 5: Time to Build



Build the new apartment complex!



Do you want to be an architect? Sign up for a design class or look up architect classes at your local college!