Wave Channel Challenge: Testing Coastal Protection

In this hands-on outreach activity, students will dive into the fascinating world of waves and coastal engineering. The session begins with a brief introduction to waves: how they form, their behavior, and their impact on coastal areas. Next, students will engage with a wave channel experiment, where they'll test the efficiency of different coastal protection structures in reducing wave overtopping.

To make the activity exciting and interactive, the class will be divided into two teams. Before testing each structure, teams will have one minute to predict its efficiency (low, medium, or high) in preventing overtopping. Points will be awarded for correct predictions, and a friendly competition will track each team's progress on a scoreboard.

As each structure is tested, we'll pause to explain the physics behind the wave-structure interaction, analyze the results, and clarify misconceptions if the predictions don't match the observed outcomes. Along the way, we'll highlight real-world examples of coastal defenses, linking the models in the wave channel to real engineering solutions.

At the end of the session, students will participate in a wrap-up reflection. Together, we'll discuss which structure performed best, why, and how real-world factors, such as cost, environmental impact, and aesthetics, play a role in designing coastal protection systems. Eventually, a brief overview of wave energy converter used as breakwater will be showcased.