

7th Plate Motion Engineering Internship: Tsunami Alert System

Driving Question: As geohazard engineering interns at Futura Engineering, how can we design a tsunami warning system for the Indian Ocean Region?

Content: Students act as mechanical/geohazard engineering interns to design a tsunami warning system for the Indian Ocean region. These warning systems must meet three design criteria: 1) giving people as much warning time as possible to move to safety; 2) causing as few false alarms as possible; and 3) minimizing cost as much as possible.

Standards: NGSS: **MS-ETS1-1:** Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions. **MS-ETS1-2:** Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem. **MS-ETS1-3:** Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success. **MS-ETS1-4:** Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved. **MS-ESS3-2:** Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects. **MS-ESS2-2:** Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales. **MS-ESS2-3:** Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions.

Major Products: Students will design an optimal tsunami warning system design, create a written proposal and create a proposal presentation

Public Presentation: Projects will be presented in class and open to the public for viewing. Presentations will be filmed as well. Students will present to peers, staff, family members, and other community stakeholders, such as local disaster management specialists and mechanical engineers