



Tsunami Simulation

Objectives:

Students will create a demonstration of a tsunami. Students will understand the driving force behind tsunamis, and water movement creating multiple tsunami waves.

Concept:

Tsunamis are driven by sudden changes and shifts along the sea floor. These shifts can be landslides, volcanic activity, or an earthquake. A tsunami wave can grow to a few meter high by the time it breaks on the shoreline. Tsunamis are some of the most impactful natural disasters, and have devastated many coastal communities and cities.

Materials:

- ⊙ Science notebooks
- ⊙ Pencils
- ⊙ Clear plastic bins (long and shallow)
- ⊙ Food coloring (blue)
- ⊙ Rocks and sand
- ⊙ Water
- ⊙ Flat piece of plastic, wood, or metal (about the size of a clipboard)
- ⊙ Small balloons (waterballoon size)
- ⊙ Brick or comparable sized rock

Preparation:

Gather materials for students to create tsunami demonstrations in groups. Set up projector or smartboard with audio to view introductory video. For additional background information on tsunamis, visit the NOAA Tsunami monitoring site: <http://www.tsunami.noaa.gov>

Introduction:

Introduce tsunami science to your class by watching this introductory 3 minute video. <http://www.history.com/videos/the-science-of-tsunamis>

Discuss the three major causes of tsunamis: landslides, underwater earthquakes, and volcanic action. Discuss the movement of water after the disturbance on the seafloor, how this causes many short waves to eventually build into one large solid wall of water as the waves approach the shallow waters near the shore.

Procedures & Activities:

Explain to the students that they will be working in groups to build a demonstration of a tsunami including the triggering activity.

Break students into groups of 4-6. Have the groups decide (or assign to groups) which triggering activity they will demonstrate in their simulator. Have the students draw a plan for the tsunami simulator in their science notebooks. Have the group members work together to discuss and decide how they will simulate the triggering activity with the materials provided.

When the groups have drawn and discussed their plan for the tsunami simulator, instruct students to use the materials provided to build the demonstration. Have the students test out their simulators and determine if they are a good representation of the triggering activity they chose or were assigned. Have the students fix any part of the demonstration. If time allows, have them build trees and buildings on their shoreline.





Tsunami Simulation Continued

When all the groups are done building and testing their simulators, have each group present and demonstrate the simulators to the class. Be sure the students explain what the triggering activity is they are simulating, and how it displaces the water to cause the tsunami.

Note: The students should build up the shoreline, a gradual slope with the small rocks and sand. The tub should then be filled with water so that the water reaches about half way up the shoreline, but still leaves a beach. Add a few drops of blue food coloring to each tub of water to better view the wave action. The flat wooden/plastic/metal piece, brick/large rock, and balloon should be used by the students to demonstrate the triggering mechanism. The flat wooden/plastic/metal pieces can be placed at the bottom of the clear bin under the water, a sharp tug up on the flat piece simulates the tension release from an earthquake. The brick or large rock simulates a landslide, and can be slid on the flat piece into the water. The balloon simulated an underwater volcanic eruption. The balloon can be blown up, held under the water, and then popped.

Wrap-Up:

Ask students to name, draw a diagram, and label the three major causes of tsunamis in their science notebooks. Have the students answer the following questions:

- How are tsunamis different from other waves?
- Are tsunamis preventable?
- What action should you take if you hear a tsunami warning?

Extensions & Lesson Connections:

For additional lessons on tsunamis, specific to Alaska, visit the Alaska Tsunami Education Program site: <http://www.aktsunami.com>

This lesson works well as a follow up to the "Geology & Plate Tectonics" lesson.

Evaluation:

Review the drawings of the models and causes in students' science notebooks. Review the students' participation during the simulator creation and presentations. Review the students' responses to the questions in their science notebooks.

