Performance Task

13.3 Wave Interaction: Superposition and Interference 27.

Ocean waves repeatedly crash against beaches and coasts. Their energy can lead to erosion and collapse of land. Scientists and engineers need to study how waves interact with beaches in order to assess threats to coastal communities and construct breakwater systems.

In this task, you will construct a wave tank and fill it with water. Simulate a beach by placing sand at one end. Create waves by moving a piece of wood or plastic up and down in the water. Measure or estimate the wavelength, period, frequency, and amplitude of the wave, and observe the effect of the wave on the sand. Produce waves of different amplitudes and frequencies, and record your observations each time. Use mathematical representations to demonstrate the relationships between different wave properties. Change the position of the sand to create a steeper beach and record your observations. Give a qualitative analysis of the effects of the waves on the beach. What kind of wave causes the most damage? At what height, wavelength, and frequency do waves *break*? How does the steepness of the beach affect the waves?