

HIGH SCHOOL STEM ENGAGEMENT USING PORTABLE WAVE FLUMES

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OVERVIEW

- Sponsored by the Office of Naval Research
- 13 wave flumes delivered to high schools along the east coast of USA (Figure 1)
- Master teachers and demonstrations for students

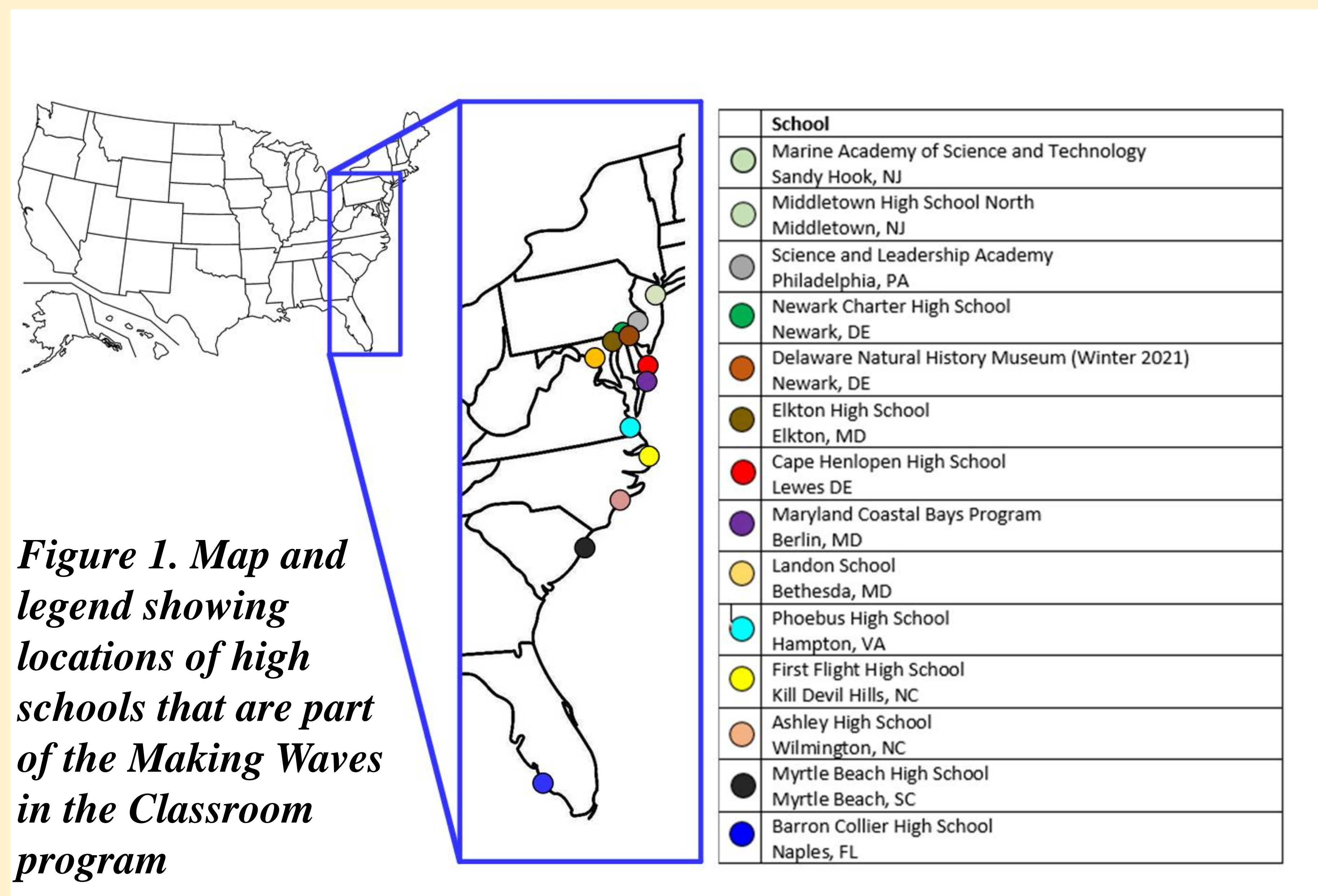


Figure 1. Map and legend showing locations of high schools that are part of the Making Waves in the Classroom program

EMPHASIS AND LEARNING MODULES

- Inspire, engage, and educate high school students
- Processes are taught and explained using a 5 m wave flume

Table 1. STEM modules for the Making Waves in the Classroom program.

Module 1: What is a wave?
Module 2: Wave parameters
Module 3: Deep vs. shallow water
Module 4: Wave speed
Module 5: Particle trajectories
Module 6: Wave energy
Module 7: Tsunami
Module 8: Beach profiles and basic theory
Module 9: Application: Beach slope and slope predictions
Module 10: Beach erosion
Module 11: Application: Beach nourishment
Module 12: Sea level rise – Effect on beaches
Module 13: Application: Protecting the beach

THE FLUME

- Two 2.4 m sections of optical-quality acrylic; 0.3 m tall and 0.15 m wide (Figure 2)
- Fast set up
- Flap paddle, DC motor control
- Mobile bed; Delrin beads; specific gravity 1.4
- Sensors and spreadsheets for data collection

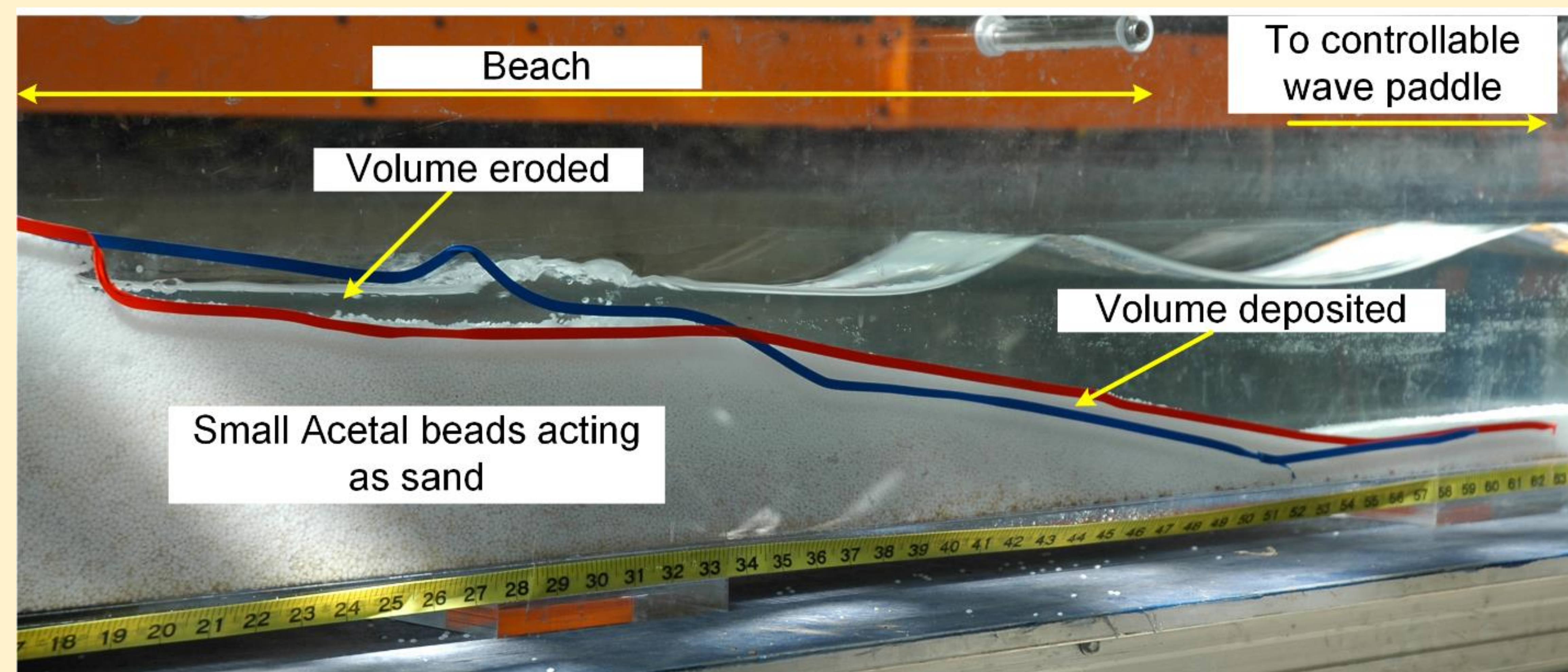
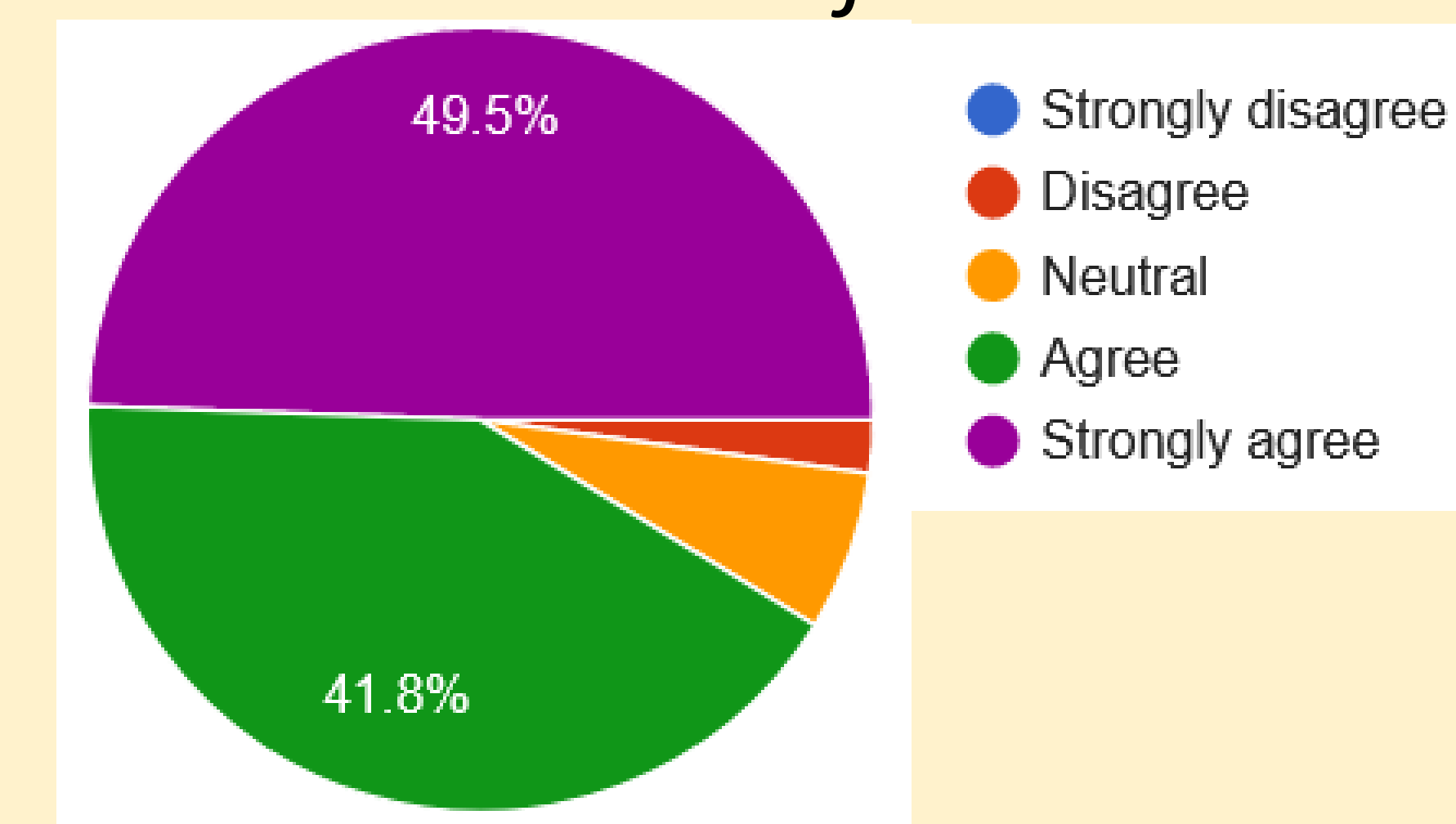


Figure 2. Wave flume showing “natural” beach using Acetal beads. Colored tape is used for volumetric analysis.

ASSESSMENT

- Adheres to science and mathematics standards and curriculum
- Pre- and post-module questionnaires
- Google forms
- Statistical analyses

The modules were fun and worthwhile



After this program, my understanding of basic coastal principles is

