

Regional Science Consortium

Erosion – Mitigation Mission

Background

Shoreline erosion is a constant force due to the interactions between water and land. The effects of this process can be reduced through the utilization of erosion control measures such as breakwaters, groins, and dunes with plants.

Objective

Students will investigate the efficacy of different forms of erosion control by building miniature sand analogs and allowing water to flow through them. Eroded sand will be collected and sand remaining in the trough will be analyzed to determine the efficacy of each method.

Materials

- 1 plastic trough per student
- Rocks
- Gravel
- Sand
- 1 plastic cup/beaker per student
- 1 plastic tray per student
- Water source

Instructions

1. Each student should begin with one trough filled with dry sand and be assigned 1 of 4 scenarios listed below to examine.
 - a. Scenario 1: No erosion mitigation (Sand only)
 - i. Students assigned to this scenario will not make any changes to their trough of sand.
 - ii. This represents a shoreline that does not utilize any erosion mitigation techniques.
 - b. Scenario 2: Sand & gravel
 - i. Students assigned to this scenario will take a small handful of gravel and add it to their trough in any way that they believe will prevent erosion.
 - ii. Gravel can be used to create mitigation structures such as groins or breakwaters. Be creative!

- c. Scenario 3: Sand & rocks
 - i. Students assigned to this scenario will take a 5-10 rocks and add them to their trough in any way that they believe will prevent erosion.
 - ii. Rocks can be used to create mitigation structures such as groins or breakwaters. Be creative!
 - d. Scenario 4: Sand with gravel and rocks
 - i. Students assigned to this scenario will take a small handful of gravel and 5-10 rocks and add them to their trough in any way that they believe will prevent erosion.
 - ii. Gravel and rocks can be used to create mitigation structures such as groins or breakwaters. Be creative!
2. Once each student has prepared their trough according to their scenario, they will place their trough into their plastic tray and fill their beaker with 250 mL of water.
 3. Hold the end of the bottle 2-3 inches in the air with one hand so it is at an angle with the spout resting on the bottom of the tray.
 4. Each student will then use their other hand to slowly pour the water into the top of the trough, allowing it to all run through the sand and out the spout into the plastic tray.
 5. Students should then observe approximately what percentage of the sand remained in their trough and enter this information in their table.
 6. As a class, fill in the rest of the table by sharing information between students.
 7. Once Table 1 is complete, answer the worksheet questions.

Clean up:

8. Any remaining sand in the troughs should be emptied into the plastic trays. Pour excess water from the trays down the drain and leave trays to dry.
 - a. **Be careful not to pour sand down the drain!**
9. Rocks and gravel should be removed from the sand and placed back in their bags once dry.