

## DREDGING IN HAMPTON ROADS HARBOR

### **Instructor Directions**

When a Hopper, Cutterhead, or Mechanical Dredge machine heads out into Hampton Roads Harbor to dredge the bottom of the river, in order to make room for the cargo, cruise, and Navy ships that come through, the dredge loosens up the river bottom and at the same time sucks up the loosened material and shoots it out into the Dredged Material Management Area at Craney Island (show map).

This experiment demonstrates how a dredge works (on a very small scale).

Step 1: Fill the bottle 1/3 full of water (the first flat line on the bottle)

Step 2: Fill the bottle to the top of the label with sand. Make sure to put the sand in the funnel slowly, so that it does not clump.

Step 3: Attach the cap and fill the water using the spigot until the water spills out of the cap a little bit.

Step 4: Insert straw (the Dredge) through the lid and push it down about 2 inches into the soil, so there is about 4 inches (use the ruler) of straw above the bottle. Once you insert the straw, you will see a water level inside the straw. Mark it with a pen.

Step 5: Squeeze the bottle using 2 fingers around the "rib" of the bottle, about at the bottom of where the straw is.

When you squeeze the bottle (which demonstrates dredging), notice what happens to the water level in the straw. It should sink. Measure the water level with the ruler again and mark it with a pen.

This means that the water is sinking into the voids in the sand (space between grains) when the shape of the sand is moved. This represents a dredge dredging the bottom of the ocean. When they dredge, the water level sinks and the sand is sucked up into the dredge. If you had super super strong hands, or something with a motor, the sand would shoot out of the top of the straw. This shows the water level sinking to allow for the dredged material to be sucked out of the ocean but not too much water. Too much water would make the dredge vessel heavy and full of unnecessary water.