

Making A Simple Salinometer



Materials



Water



Saltwater Solution

Several types of salinometers/hydrometers can be made. The simplest is a hydrometer calibrated to read in % of salt (most often NaCl) concentration (e.g., dissolve 5 grams of salt in water until a total volume of 100mL is reached = 5%). Follow the instructions below to make and calibrate a simple salinometer.

Materials:

- soda straw
 - modeling clay
 - a fine-tipped permanent marker
 - a tall clear container to hold the solution for calibrating your device
 - salt for mixing one or more standard solutions
 - water (tap water will work-distilled is better)
1. Mold a ball of modeling clay around one end of the straw. Make sure that the clay prevents water from leaking into the straw. Try to avoid forming pits or voids in the clay that can trap air.
 2. Fill the container with water. Carefully insert the straw (clay covered end down) and add/remove clay until the straw floats at the maximum depth you wish.
 3. Use the permanent marker to mark the depth where the salinometer floats in the water (0% salt solution).
 4. Mix a saltwater solution of known concentration to use as a calibration standard. (10% is a good choice to start at!)
 5. Place the salinometer in the calibration standard and mark the level where it floats.
 6. Interpolate/extrapolate from the two marks you have made to add additional lines on the scale. You can calibrate your device using additional standards at other concentrations to improve its accuracy. Supervisors will often ask you to record the percentage 1-10 and estimate the tenth.

You are not limited to this simple salinometer. Use your library, the internet or other resources to research how to make a device with better accuracy and sensitivity.

Note: At Nationals, the saltwater solution (most likely NaCl) will be made by adding salt to a volume of water until a predetermined total volume is reached (e.g., a 6.5% solution can be made by dissolving 65g of NaCl in water until a total volume of 1L is reached. Teams will record concentrations in percent (1-10 and estimate the tenth). At Nationals (maybe State) any percent ± 0.5 (maybe ± 1 at Invitationals/Regional) will be given full credit (partial credit may be awarded for other percents). The points for this testing should be approximately 5% of the total score (e.g., if a team recorded between 6.0-7.0%, they could receive 5 points out of 100). There is no restriction on the salinometer type as long as the team builds it.