Building the Trieste Model

Teacher Instructions

This activity was adapted from a publication by Marilyn Sniffen in the *Marine technology Society* journal from the winter 2009. The construction is very basic and can be varied. For example, in some cases I chose to forgo construction of the release mechanism, and focus on getting the model to establish neutral buoyancy. The model is meant to represent the Trieste, a lead/iron submersible that used gasoline filled compartments to for buoyancy. See *Trieste Worksheet Teacher* for background and objectives.

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| Materials for model | Materials for release mechanism |
| One .5L water bottle per student group  Vegetable oil (enough to fill each bottle)  Hot glue gun  Rubber bands  Twist tie  Large tank of water (should be deep)  Funnel | 2 Lids to film canisters (the old black and grey ones) or a comparable figure.  2 rubber bands  Paper clip or wire to make a weight bearing hook  Alka Seltzer tablets (one per)  Drill with 1/16” and 1/8” bits |

1. Using the funnel, pour the oil into the bottle until filled to the top (avoid air bubbles as much as possible). Put the cap on.
2. Locate the center of mass of the bottle by balancing it between the thumb and forefinger.
3. Mark the center of mass with a sharpie or tape.
4. Extend one rubber band long ways around the bottle and one across the middle. The rubber bands should intersect at the mark for the center of mass. Secure with a dab of hot glue.
5. Loop the twist tie at this intersection
6. Now on to the release mechanism. Mark the “top” position of all the lids, then drill a single 1/16” hole between the ridges of the lids at this mark.
7. Drill three 1/8” holes in a vertical line in the center of each lid from the top to the bottom.

Note: These modifications can be done to all the lids by the teacher or by the students if the circumstances are appropriate.

1. On ONE of the lids, clip a single 1/8” wide gap through both the inside ridges of the lid at the “bottom” position.
2. At the left and right of the OTHER lid, clip a 1/8’ wide gap through the outer ridge only on each side.
3. Using pliers, bend the paperclip or wire straight and make a hinge by running the wire through the 1/16” hole at the top of each lid.
4. Hook the other end of the wire like a Christmas ornament
5. Nestle the Alka Seltzer tablet in the inner ridge of one of the lids, and then slide the other lid over it so that it is sandwiched between them.
6. Make sure the Alka Seltzer tab stays securely between the lids
7. Expose the Alka Seltzer tab. Loop one rubber band around the edge of the tablet so that the rubber band is nestled between the Alka Seltzer and the inner ridge of the lid.
8. The excess loop of rubber band should be brought through the gap so that it sticks out when the two lids are closed. This is where the weights will attach.
9. Wrap the other rubber band around the outside of both lids to secure them shut. This rubber band should nestle in the gaps cut on the right and left of the lid.

\*Weights can now be attached to the release mechanism and it can be attached to the bottle. When the model is submerged, the Alka Seltzer will dissolve and the inner rubber band will slip out, dropping the weights.

