

### **EVENT 3: The Hooked Cartesian Diver**

(As of 10/26/11)

**OBJECTIVE:** To design and build hooked Cartesian divers that will retrieve different types of hooked sinkers in the least amount of time.

#### **RULES:**

1. The Cartesian divers must be designed and constructed by the team and brought to the competition fully or partially constructed.
2. The Cartesian divers may be constructed from any of the following materials: plastic transfer pipettes, tape, fasteners, wire, and glue.
3. The Cartesian divers must have an attached hook so that it is able to retrieve hooked sinkers.
4. The Cartesian divers, including the hooks, may not be over 8 centimeters long and must be able to fit through the opening of a one liter plastic soda bottle, diameter about 2.3 cm.
5. The team may design different types of Cartesian divers to anticipate different types of hooked sinkers (e.g., different weight sinkers, sinkers of different sizes or sinkers with the hook located in different positions).
6. A hooked sinker will be placed inside a one-liter plastic soda bottle filled to the brim with water.
7. The team will lower or raise the diver to hook the sinker by applying pressure from their hands to the sides of the plastic soda bottle. No other way to change the position of the diver will be allowed.

#### **COMPETITION AND SCORING:**

1. The team will have 10 minutes to complete this event.
2. Three (3) one-liter plastic soda bottles filled with water and containing a hooked sinker will be placed on a table.
3. The team will place their diver into one of the plastic soda bottles, refill the bottle to the brim with water, retrieve and remove the hooked sinker and Cartesian diver from the bottle and then repeat for the remaining bottles.
4. A small beaker and plastic transfer pipette will be provided for the team to refill the bottles to the brim with water.
5. When placing or retrieving the diver into or from the plastic soda bottles, tweezers or similar devices, provided by the team, may be used.
6. The bottle must remain in contact with the surface of the table.
7. The bottle may not be tilted more than 45 degrees from the vertical (visually judged) while retrieving the sinker.
8. The team may use different divers for each bottle but the team cannot load the next bottle until the first diver is retrieved and placed on the table.
9. Each retrieved sinker will receive a score of 100 points.
10. The team with the most points wins.

$$SCORE = \frac{(Your\ team's\ points)}{(Winning\ team's\ points)} \times 100\ points$$

**DISQUALIFICATION SCORE** = 50 points awarded for a qualifying Cartesian diver that is capable of sinking and rising as described in rule 7.