

JUNK BOX WARS

Super Subs

Create submarine that will sink and come to the surface in the shortest amount of time.

Competition Rules:

Each team will be provided with a junk box filled with materials that could be used to create a submarine. Each team will received only set of materials. Teams may use all or part of the materials in their junk box and are not allowed to share materials with other teams. All unused materials should be saved in case repairs are needed during competition.

Teams will be allowed time to build and test their submarine. Competitors are allowed to bring diagrams to help them build their submarine. After the time is up, all submarines will be impounded and no changes will be allowed.

Machine Requirements:

The submarine cannot be aided by a helping hand or other energy source.

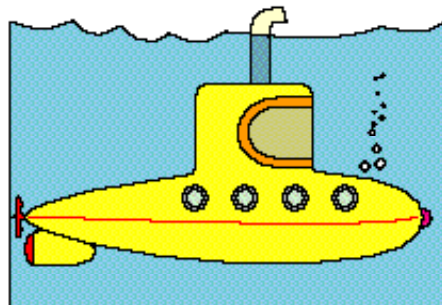
Testing Procedure:

Each team will be allowed 5 minutes to prepare their submarines. Each team will be allowed two trials with 5 minutes allowed between trials for repairs and adjustments using materials left over from construction. No new construction or major design changes are allowed.

The best time out of the two trials will be considered for final results. In the case of a tie, the lightest submarine will be declared the winner.

Junk Box Possible Supplies:

- CDs
- Soda bottles
- Pencils
- Straws
- Film canisters
- Rubber bands
- Yogurt cartons
- Masking tape
- Glue
- Pipe cleaners
- Pennies
- Marbles
- Antacid tablets



Event Score Sheets



Super Subs

Team Name: _____

Team Members :

Mass of sub = _____ g

Trial 1:

Time = _____ s

Trial 2:

Trial 2 = _____ s



Super Subs

Team Name: _____

Team Members :

Mass of sub = _____ g

Trial 1:

Time = _____ s

Trial 2:

Trial 2 = _____ s



Super Subs

Team Name: _____

Team Members :

Mass of sub = _____ g

Trial 1:

Time = _____ s

Trial 2:

Trial 2 = _____ s



Super Subs Teacher Notes

Recommended Supply List:

2 CDs	2 Soda bottles
4 Pencils	10 Straws
3 Film canisters	3 Rubber bands
2 Yogurt cartons	100 cm of Masking tape
10 Pipe cleaners	15 pennies
Hot glue gun + 5 sticks of glue	15 marbles
4 Effervescent antacid tablets	

Notes:

(1) Students may use all or part of the materials in the junk box. I allow the students to use any material inside the box. For example, if any of the materials come in wrappers or boxes, teams may use those for the device. The materials may be modified with the understanding that if a goof is made they will not receive new materials. Leftover materials may be used to make repairs if the device breaks during competition. No major design changes are allowed!

(2) Students may build a variety of submarines. It can be built by using the water bottle or the film canister. The key will be to use the right amount of pennies or marbles to make it sink and the right amount of baking soda and vinegar to make it rise. The reason for the antacid tablets is it takes away the need to have the exact measurements. Encourage them to find out how much it takes to sink it first and go from there.

(3) You will need to obtain something for them to float and sink in that is big enough, such as buckets, plastic dishpans, or a fish tank. If you decide not to provide soda bottles, a smaller tank could be used.

(4) It is also helpful to have the same timer for each one. Someone not tied to it if you need to monitor the group. Former students or another teacher/parent may be willing to act as timers.