The Try-Physics Tournament
Second Task: Boat Rescue

Physics Camp at Home Activity

For more information on the Try-Physics Tournament, see Task 1 on the website.
Just like Harry, your Second Task is to rescue hostages from the lake. Unlike Harry, you'll have to use physics to do it! Use the materials provided to design a barge or boat that will support as much weight as possible when placed in a pool of water.

Suggested materials*:

- 10 plastic drinking straws
- 4 disposable cups
- 1 wooden pencil
- 1 ziploc bag
- 1 paper plate
- 20 cotton balls
- 25 popsicle sticks
- One 3-foot piece of twine
- 5 sheets of computer paper
- 15 pipe cleaners
- 1 3-foot sheet of aluminum foil
- 1 pair of scissors
- 1 roll of Scotch tape or masking tape

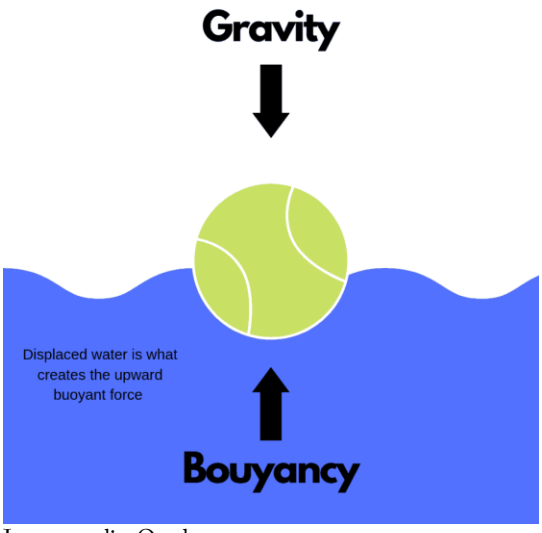
Also: A large container of water with a wide opening that you can use as the "pool" to test the boat (a kiddie pool, large bucket, etc.), lots of small objects that you can use as the "hostages" (metal washers, paper clips, beads, etc.), and a towel to clean up any spilled water!

*Parents, feel free to use different numbers of supplies or to substitute other fun building and construction materials that you have around the house!

Physics principles:

Here are some important physics concepts to keep in mind while you're building your device.

Buoyancy is a force that pushes "up" on objects in water to keep them from sinking. In order for an object to float, the force of buoyancy needs to balance the force of gravity that is trying to pull the object down in the water. *How can you build a boat so that the part that is underwater weighs less than the amount of water it is displacing? (Hint: Are boats usually solid or hollow?)*



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Density is how much mass an object takes up, divided by its volume (the amount of space it takes up). Objects will float if their density is less than the density of water. *Do you want your boat to have a large density or a small density in order to float? What techniques can you use to change the density of your boat?*

Recommended rules:

Once your barge is ready, place it in the pool of water. Take your test objects (your "hostages") and slowly place them one at a time on the barge. You can choose where on the boat you place each object; be strategic!

Keep placing these test objects one at a time on the barge until it starts to sink. The maximum number of objects that the barge can support before it sinks is the final number of successes—multiply that by 2 points per object to get your score.

You can place the objects anywhere you want on the barge, but if one falls off into the water, that counts as the barge sinking—you don't want to lose people in the Lake!

50 pts: *Not bad—don't let the Grindylows get you!*
100 pts: *Good use of the Bubble-Head Charm!*
150 pts: *You must be half shark like Viktor Krum!*
200 pts: *Way to show off your physics ingenuity and, like Ludo Bagman says, outstanding moral fiber!*

"Come seek us where our voices sound…"