

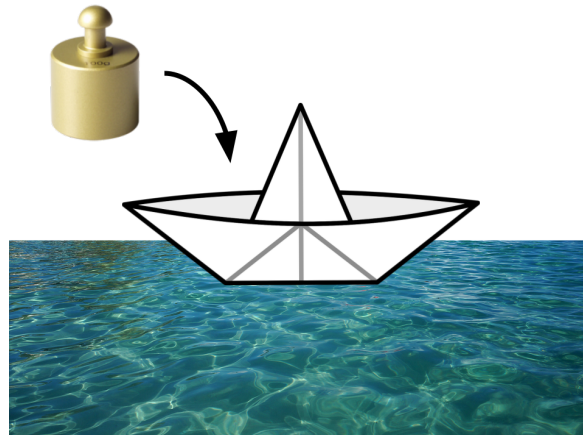
Go With The Float!

Challenge Objective:

Design and build a boat out of only household items. The goal is to see how much weight your boat can hold without sinking.

Rules:

- Before any weight is added, add the boat to the container of water that will be used. This can be a pool, a bucket, a lake, a river, or a reservoir. Other types of containers can also be accepted at the discretion of the judges.
- The water container cannot have extra salt, minerals, or additives added to it to alter the density of the liquid. This also means the water cannot be cooled to increase the density. The water should be as close to room temperature as possible.
- The boat may not be in contact with any edge of the water container and may not touch the bottom of the water during the addition of weight.
- The boat can be of any shape or size.
- The boat cannot be connected to land and students cannot touch the boat while adding weight.
- No form of propulsion can be added.
- When adding weight, weight has to be added a little bit at a time and students must wait at least 3 seconds for the boat to stabilize before adding more weight. Only the total weight before the item that made the boat sink was added will count. Therefore, if you add a 1lb weight to the boat which makes it sink, the weight will not count.



Materials Allowed:

-Any household items that are readily available can be used in this challenge. Aluminum foil, rubber bands, plastic bottles, bottle caps, toothpicks, tennis balls, etc,... Do not use any electronics.

Design Tips:

- Be creative!
- Remember things that have a lower density than water will float and things that have a higher density than water will sink. Try and make a boat that is as light as possible while being structurally stable!
- Try using different materials, some items might surprise you with their ability to float.
- Personalize it and make it feel like a boat you would like to live in if you want to try and win the creativity challenge!

Content Required for Submissions:

- One paragraph describing how you built your boat and your thought process behind it, any failed designs, what you learned from them, and how you could improve on your final design.
- A precise list of materials used
- Total weight supported before the boat sank. Please use metric units if possible. The boat by definition has sunk when every part of the boat is submerged. If you do not have a scale at home, try and go to the post office to get your items weighed!
- Pictures of the boat: one from the side and one from the top. A measuring tool has be present next to the boat on the picture so that the area of the boat can be calculated
- Video of the process of weight being added bit by bit until the boat sinks
- Photo of all the items that were added to the boat being weighed

How will winners be selected:

- Judges will review all submissions. To qualify for the challenge, all 6 items described above have to be submitted to the judges.
- The judges will then verify all rules have been followed by participants.
- If the area of the boat was not included in the submission, judges will use the top-down image to estimate the area of the boat
- The overall winner of the design challenge will have the highest weight divided by area ratio.
- The most creative design as judged by the judges will also win a prize!

Boat Creativity Prize Grading Rubric

Student Name:

Category	4: Exceptional	3: Skillful	2: Adequate	1. Basic	Score
Hypothesis	The student clearly went above and beyond to think about all the various options available to them and how to maximize the weight to surface area ratio	The student spent significant time on hypothesizing how to maximize the weight to surface area ratio of the boat.	The student has thought well about how to maximize the weight to surface area ratio but is missing some key points in their thought process	The student does not seem to have thought much about how to maximize the weight to surface area ratio of their boat	
Design Process	The student thoroughly explains their different designs and materials used and how they settled on their final design	The student explains well their various design elements and the iterative process they went through to settle on these.	The student explained in vague terms their different designs and how they chose their final design.	The student has little to no explanation of their different designs and what they learned from them	
Materials	The student went above and beyond to find creative materials to build the boat out of and use them in creative ways	Creative materials were used to create the boat	While standard materials were used, they were used in a creative way	The boat was built with standard materials	
Presentation	The boat looks like a boat you need to buy and absolutely want to live on	The boat is appealing and looks like something you wouldn't mind to live on	The boat has some decorative features or design elements	The boat does not have any appealing features and is built solely for weight-bearing	

Total:

P.S.: Don't forget there is a separate prize for the boat that has the highest weight to area ratio, this rubric is solely for the creativity prize!