



Engineering Challenge: Clay Boats



Your challenge is to make the best boat you can with a given amount of clay. "Best" means that the boat is able to hold the most weight without sinking.



Start with a lump of Plasticine® clay.



If you put it in water it will sink.



But if you shape it into a boat, it will float.



It may continue to float even if you put some objects in it.



If you put more things in the boat, it will float lower in the water.



If you put too much in the boat, it will sink.

Tips

1. Use Plasticine® rather than a water-based clay, which would tend to come apart in the water.
2. Have several people or teams make boats starting with the same amount of clay. We used a piece with a mass of 100 grams. We used paper clips for weights. You can use tacks, screws, washers, coins, or any small objects that are uniform in mass and that you have many of.
3. Send us your results. You can include:
 - observations and descriptions of what you did
 - explanations of what you think makes the best boat
 - pictures of your boats
 - tables of your results showing how much weight each boat held.

Some Suggestions

If you are trying this challenge by yourself, you don't need to worry about the mass of the clay you use for your boat. But if you have several people or teams building boats, they all need to have the same amount of clay if you want the comparison of results to be meaningful. We suggest that everyone participating in this challenge use 100 grams of clay so we may share and compare results obtained by people working independently around the world.

Similarly, if you are working alone or in a local group, you don't need to know the mass of your weights with precision as long as they are all pretty much the same. But to compare among different groups we need to use standard measures.

Unless you have a very precise scale it is difficult to determine the mass of a single paper clip or coin accurately. Furthermore, their masses may vary somewhat from one to the other. We started with 100 paper clips and put them on a scale that was precise to 1 gram. The mass of 100 clips was 52 grams, so we figure that on average, the mass of each paper clip is 0.52g. You will be using many of these objects on your boat, so the average mass is valid. The small variations will tend to cancel each other out.

Our boat held 60 paper clips before sinking with the addition of the 61st clip. The mass of the 60 clips is 31.2 grams.