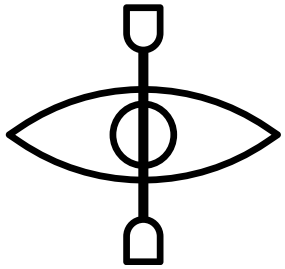
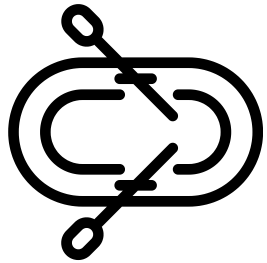


Sinking and Floating



Activity #3: Boat Engineering

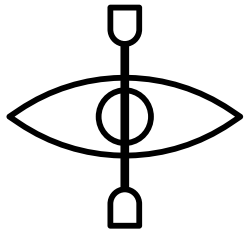
In this activity, we will be designing and testing tin foil boats.

Boats are important for transporting humans, food, and other necessities across the ocean. This engineering is called marine engineering. To successfully build a boat that not only floats, but can also carry weight, depends on the boat's size, material, weight, and shape.

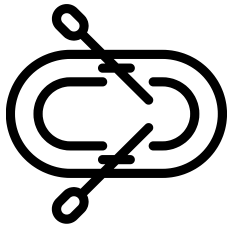
For this experiment, we will focus on engineering a boat shape that will carry as many stones as possible without sinking by testing two common boat shapes, a raft and a canoe. **Which boat shape do you think will hold the most weight?**

My hypothesis:

I think the **canoe-shaped / raft- shaped** boat will hold the most weight.



Sinking and Floating



Activity #3: Boat Engineering

Materials

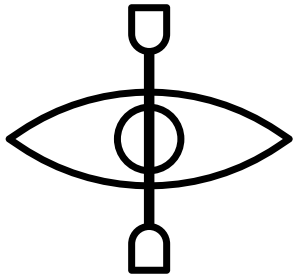
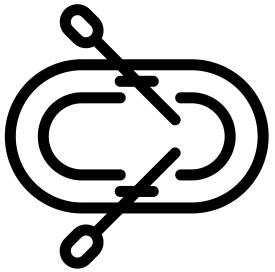
- Tinfoil
- Stones, pebbles, or other uniform weights
- Tub of water, sink or pool
- Towel
- Slotted spoon

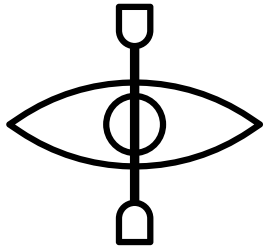
Directions:

1. Cut two pieces of tinfoil
2. Fold the first piece into the shape of a canoe. This means that it has a long, thin, curved body that comes to a point at each end. This can be achieved by pinching the ends of the tin foil together.
3. Fold the second piece of foil so that it is broad and flat. This can be achieved by folding up just the edges into a square-like shape and pressing flat the middle.
4. Place the canoe-shaped boat into the tub
5. Slowly, add one weight at a time being sure to distribute the weight evenly throughout the body of the boat (i.e. do not pile them all in the middle). Count how many weights the canoe-shaped boat can hold before capsizing (sinking). Record how many weights the canoe-shaped boat held.
6. Using the slotted spoon, retrieve the weights from the water and dry them with the towel. Repeat for 5 trials and average.
7. Place the raft-shaped boat into the water.
8. Repeat Step 5 and 6.

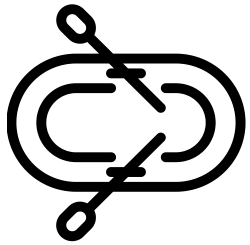
Sinking and Floating

Activity #3: Boat Engineering

	Trial 1	Trial 2	Trial 3	Trial 4	Trial 5	Average
Canoe 						
Raft 						



Sinking and Floating



Activity #3: Boat Engineering
Wrap-Up

In this experiment, we learned that the shape of an object affects how buoyant it can be. While the boats were made of the same material (tin foil) and were approximately the same shape, the boats were able to carry very different amounts of weight just because of their shape.

One possible reason is due to weight distribution. If a boat is narrow, there is less space to distribute weight which might mean parts of it get heavy faster.

Another reason might be the amount of space a boat takes up. A small boat displaces just a little bit of water where a big, flat boat might displace alot of water changing how buoyant it is. Think about why you think each boat did better or worse for our next buoyancy challenge!