

## Build a Cardboard Boat



### Materials

- › Cardboard
- › Foil
- › Tape or glue
- › Scissors (with adult supervision)
- › Rubber bands
- › A weight of approx. 200 grams

### Activity Overview

- › This task is all about buoyancy, by creating and learning from different designs, you will be able to see which designs can carry the most weight and are more buoyant.

### Activity Plan

1. Sketch out several boat designs, it can be as basic or as complicated as you like, as long as you think you can make it out of cardboard.
2. Next draw out the basic shape of your boat on the cardboard, and cut it out.
3. Create walls for your boat from cardboard.
4. Stick the bottom of the boat and the walls together with tape or glue.
5. Back everything with foil – be careful not to leave any gaps where the water can get in.
6. Set your boat afloat in the sink or a bath.
7. Slowly add the weights into the boat.

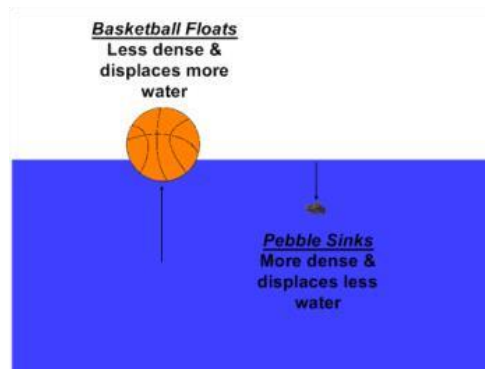
## Learning Objective

### Sinking and Floating

› Have you ever tossed a small pebble into a lake or river? What happens? It sinks, right? Have you ever wondered why that little pebble sinks to the bottom, but a huge boat made of metal floats on top of the water? Let us investigate and find out! Go around your house and grab a few different objects, it could be anything from fruit to coins, to a can of diet coke, and fill your sink with water. Time to test these by placing the objects into the water!

Were any of the results surprising, and did you notice anything about the objects that floated?

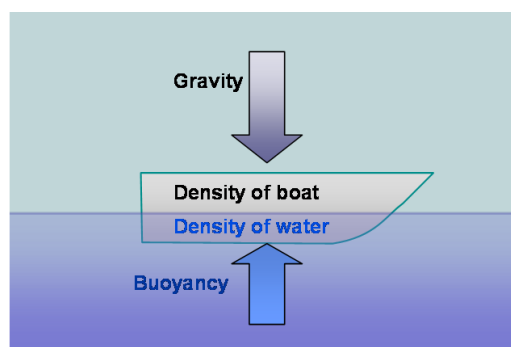
› Every object that you put into water will either float or sink. It does not have anything to do with how big the object is. For example, you could put a metal spoon in water and it will sink, but a piece of paper as big as your house might float. Therefore, size does not have anything to do with sinking and floating. What does?



### Density and Water

› Density is what decides whether an object sinks or floats. Density is affected by how much an object weighs in a specified area. Therefore, if you filled a shoebox with feathers and weighed it, and then filled the same size shoebox with pebbles and weighed it, they would not have the same weight. The pebbles would weigh more.

This means that the shoebox with pebbles is denser than the shoebox with feathers.



› When a boat is placed in water, it displaces an amount of water equal to the boat's weight – as long as the object is less dense than the water, it will float.



### Reflection Questions

- › How can you change your design so that it can hold more weight?
- › Using the principles that you have learnt about density and weight, how do you think submarines are able to rise to the surface, but also able to dive to the bottom of the sea?