Why Do Ships Float?

Ever wondered how a metal ship like the *SS Great Britain* floated? Try this simple experiment to find out.

You will need:

- Kitchen foil
- Scissors
- Ruler
- Ten 1p coins
- Bowl or bucket
- Water

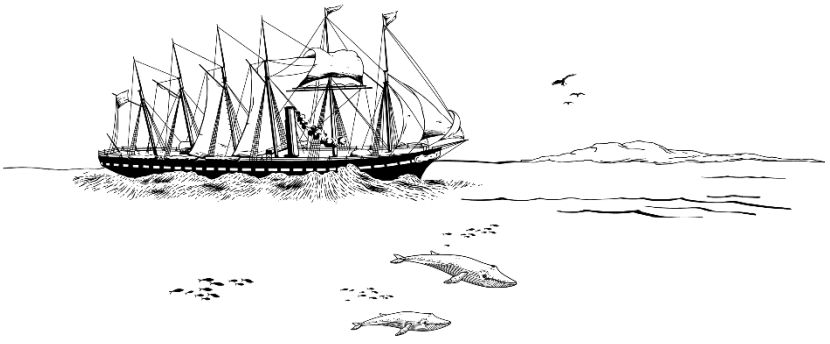
What to do:

1. Cut out two pieces of kitchen foil both 10cm square.
2. Put five 1p coins in the middle of one piece of foil. Then crumple the foil around the coins, very tightly, making a small ball.
3. With the other piece of foil, fold the edges up tightly forming a boat shape. Place the other five coins in the foil boat.
4. Put some water, into either a bowl or bucket.
5. Place both the ball and the boat into water. What happens?

Why does this happen?

When a ship is put in water it floats. This is because it is partially supported by the water. The 'loss of weight' is equal to the weight of water which is pushed aside (displaced).

An iron bar would sink as it weighs more than the water it displaces. Yet if that same amount of iron was made into the hull shape of a ship, it would float. This is because it takes up more space in the water and increases the upward push of the water.



Why Do Heavy Ships Float?

An empty bigger ship weighs more than an empty smaller one, so if you start adding the same cargo to both ships which will sink first?

You will need:

- Kitchen foil
- Scissors
- Ruler
- Lots of 1p coins
- Bowl or bucket
- Water

What to do:

1. Cut out two squares of kitchen foil, one 8cm x 8cm and the other 16cm x 16cm.
2. Fold each piece of foil into a boat shape.
3. Put some water, just deeper than your boat, into either a sink, bucket or bowl.
4. Carefully place your smaller boat into the water. Slowly add one penny at a time to the boat, make sure you spread the money out in the bottom of your boat so that it doesn't capsize. Keep adding coins until it sinks.
5. Remove the sunken boat and coins from the water. Count how many coins the boat could hold before sinking (the one you added that made the boat sink doesn't count!)
6. Repeat the process with the larger boat. How many pennies could the bigger boat hold?

Why does this happen?

The bigger boat displaces (pushes aside) more water, due to its larger surface area. It also receives greater up thrust from the water than the smaller boat. When the weight of the boat and the up thrust are balanced the boat will float. However, once the boat becomes too heavy the forces are no longer balanced and the boat will sink.