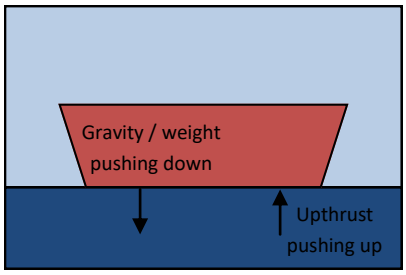
CANAL EXPLORER: EXPLORING BUOYANCY

Have you ever noticed that some things will sink when they're put into water, and other things will float? What makes things sink or float? Let's explore and find out!

Whether you're playing in the bath, doing the washing up in the sink or swimming at the pool you'll probably know that some things float on water, whilst other things always sink to the bottom no matter how hard you try to make them float. Every **force** that exists has an opposite force, so when an object is pulled downwards into the water by **gravity** another force pushes the water back up towards the object - that force is called **buoyancy**. You can also call it **upthrust**. We often think of the strength of the force of gravity pulling down on an object as its **weight**.



If the force of gravity on the object is stronger than the upthrust, the object will **sink**. This is why **heavy** objects sink. If the upthrust is stronger than the force of gravity pulling on the object, it will **float**. This is why **light** objects float.

But how can we figure out which force will be bigger?

That's all to do with the **density** of the object and the density of the water. You can think of density as being the amount of something within a set amount of space. Imagine a plastic box. We could put one piece of fabric inside the box and put the lid on - there would be lots of air inside the box with the fabric and lots of room for the fabric to move around. The box would have a **low density**, because there would be a lot of empty space inside. If we put lots of fabric inside the box, keeping pushing more and more in until there is no free space left, the box will be heavy and have a **high density**.

The **shape** of an object can affect its density too - if the shape of the object means it will contain lots of air then it makes the object much less dense. Think about a rubber ring, or a foamy pool float - they have one big hole or lots of little holes inside them full of air to make them less dense, so that they float really easily.

Turn over for some activities to do at home!

You can get hands-on with buoyancy at home - let's see if things sink or float!

Make sure you ask a grown-up before you put anything in water, just in case it's something that shouldn't be getting wet.

You'll need; something to hold water (like a sink with a plug, a bath, a washing up bowl, bucket or large bowl), objects to test (maybe some plastic toys, a wax crayon, fruit etc.)

1. Choose six of your items - three that you think will float and three that you think will sink. Why do you think they'll behave like that?
2. Fill your container with water. Don't fill it all the way to the top so it doesn't spill when you put the objects in.
3. One at a time, put the objects into the water. Were your predictions (what you thought would happen) right or wrong?

Why do boats float? Let's find out how shape affects buoyancy!

Boats are often made of heavy things like steel, but they still float! That's because the shape of an object affects how buoyant it is.

You'll need; something to hold water (like a sink with a plug, a bath, a washing up bowl, bucket or large bowl), plasticine, kitchen roll or a tea towel

1. Plasticine is more dense than water. Start by making your plasticine into a ball and dropping it into the water. It should sink to the bottom - if not you'll need to make a bigger ball!
2. Get your plasticine out and dry it off on some kitchen roll or a tea towel. Now use your fingers to reshape the plasticine into a bowl or boat shape.
3. Place the plasticine gently into the water. It should float!
4. Experiment with different shapes. Which shapes sink, and which shapes float?

Something very clever is happening here. When you make a bowl or boat shape, you're making the plasticine shape contain air and so it is less dense than a shape that doesn't contain any air. This happens even though you haven't trapped the air inside like you might in an inflatable ring. If you put your boat shape under the water you'll see that it still sinks like the ball does - that's because you've replaced the air in your shape with water!