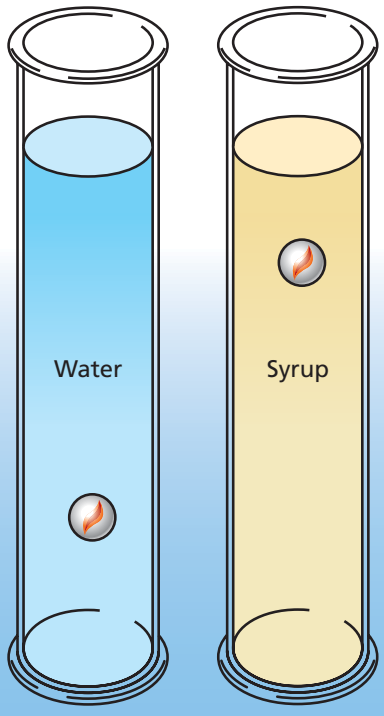
9 Water resistance

Friction in liquids, such as water, can be important. It can slow things down, but it can also speed them up.

Unless we move very fast on land, or in the air, we do not need to think about the way that air pushes against us as we move. However, water is a thick substance compared to air, so it is hard to move about in water even at slow speeds. The way that water pushes back on objects is called **WATER RESISTANCE**. It is friction in water.

The stickiness of liquids

Every liquid has its own unique stickiness. If you drop a marble in a jar of syrup, and at the same time drop another one in a jar of water, you will see the marble fall much faster in the water than in the syrup (Picture 1). The syrup is naturally thicker and more sticky than the water and so it is harder for the marble to move through it.



◀ (Picture 1) An object, such as a marble, will fall faster in water than in syrup because water is less sticky.

▶ (Picture 2) Viking longships cut through the water. They are an example of a streamlined shape.

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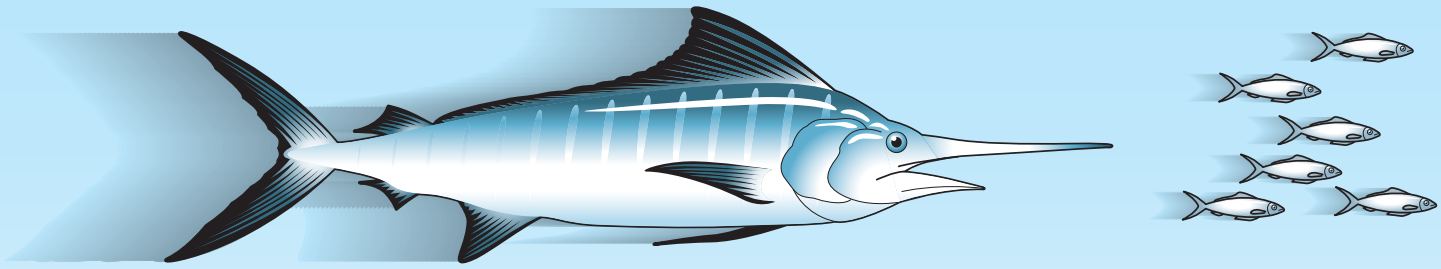

▲ **(Picture 3) Marlin are the supreme hunters of the open oceans. Despite weighing up to half a ton they have such a streamlined shape they can reach 60km/h and outpace the fish they are chasing.**

You can see this in another simple test. Try moving a spoon about in a jar of water, then move the same spoon about in a jar of syrup.

Making boats move more easily

Boats are designed to move as easily as possible through water. One way to make a boat move more easily is to give the hull (the part in the water) a smooth surface.

Another way to make it easier for a boat to move through water is to give it a shape that 'cuts' through water easily. This is called **STREAMLINING** (Picture 2).

Natural streamlining

Fish and other water-living creatures have to be able to move quickly in water. The marlin can move through water at 60km an hour (Picture 3). Its body is streamlined, so it can cut through the water and allow the fish to move easily.

Fins, paddles and propellers

If we want to move on land, we push against the ground. When canoeists or motor boats want to move they have to push against the water. They do this using the opposite of streamlining. When canoeists move, they put the flat blade of the paddle into the water and push hard (Picture 4). Similarly, a fish pushes the flat of its tail and fins from side to side. As the tail and fins push against the water, the water pushes back and gives them the force they need for movement.

Summary

- **Water is a much thicker substance than air and so it is more difficult to move through.**
- **Boats and fish have to be streamlined to move easily through the water.**

▼ **(Picture 4) Canoeists push the flat blade of the paddle against the water to force themselves forwards.**

The canoe is also streamlined to cut through the water with as little resistance as possible.