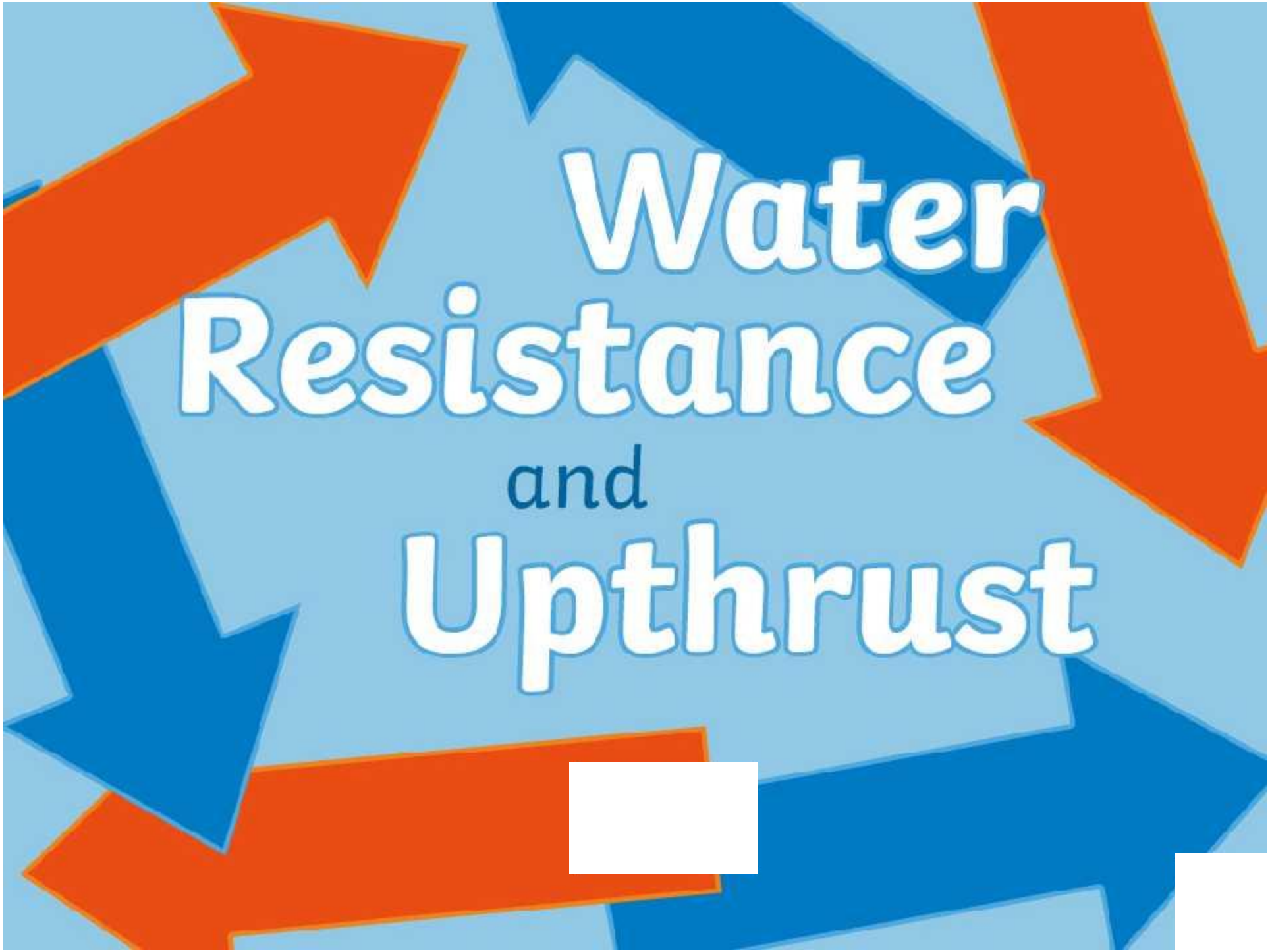

Water
Resistance
and
Upthrust

Aim

LO: To understand the relationship between **gravity** and the **upthrust** of water.

- To know that water resistance is a type of **friction**, which is a force.
- To understand that water resistance can slow objects down in water.
- To know what is meant by the word '**upthrust**'.

Recap

Friction is a force that acts between two surfaces. It can slow down or prevent them from moving at all.

A

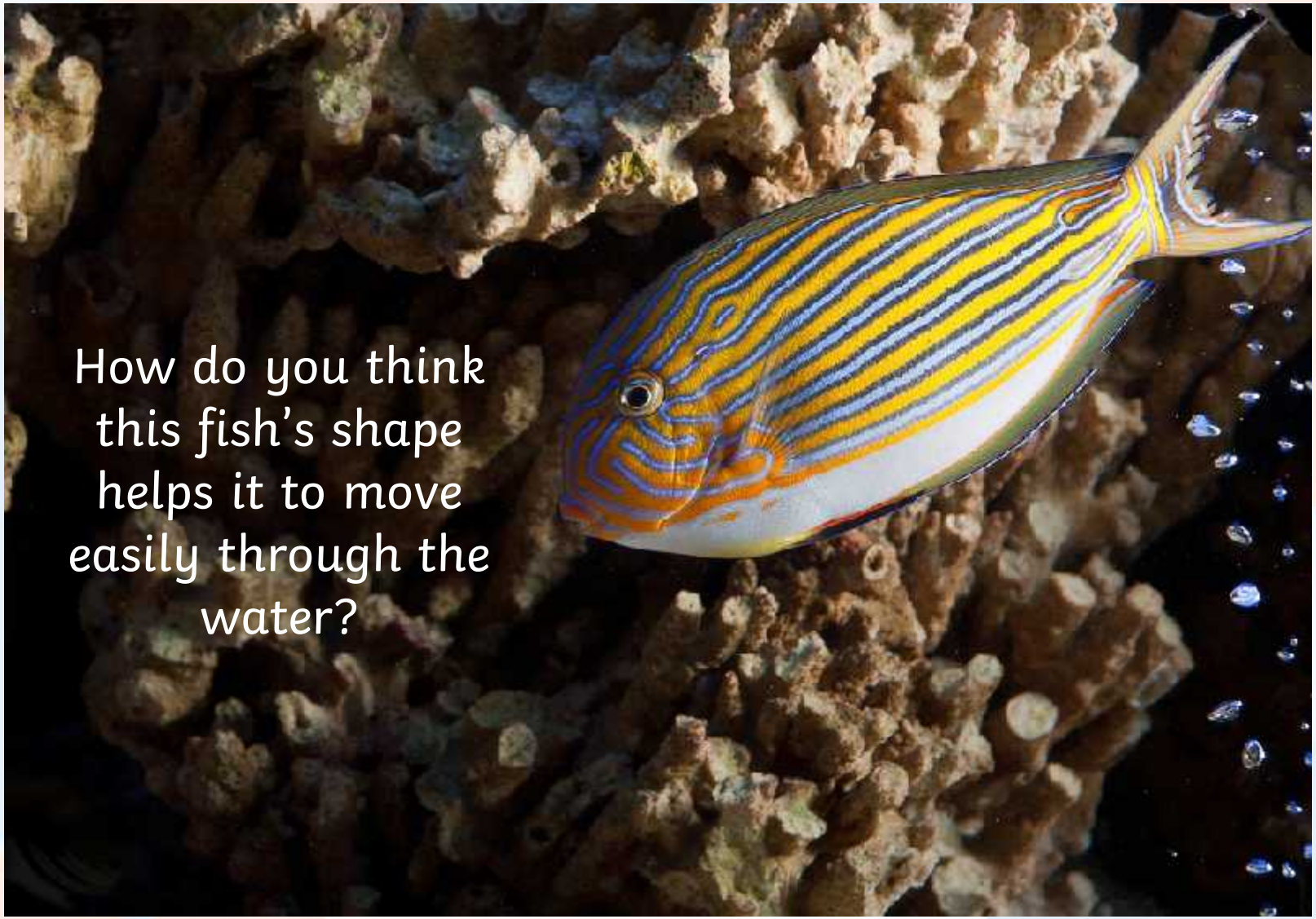
B

Which car tyre will create the **most** friction with a road?

Air resistance is a type of **friction**.

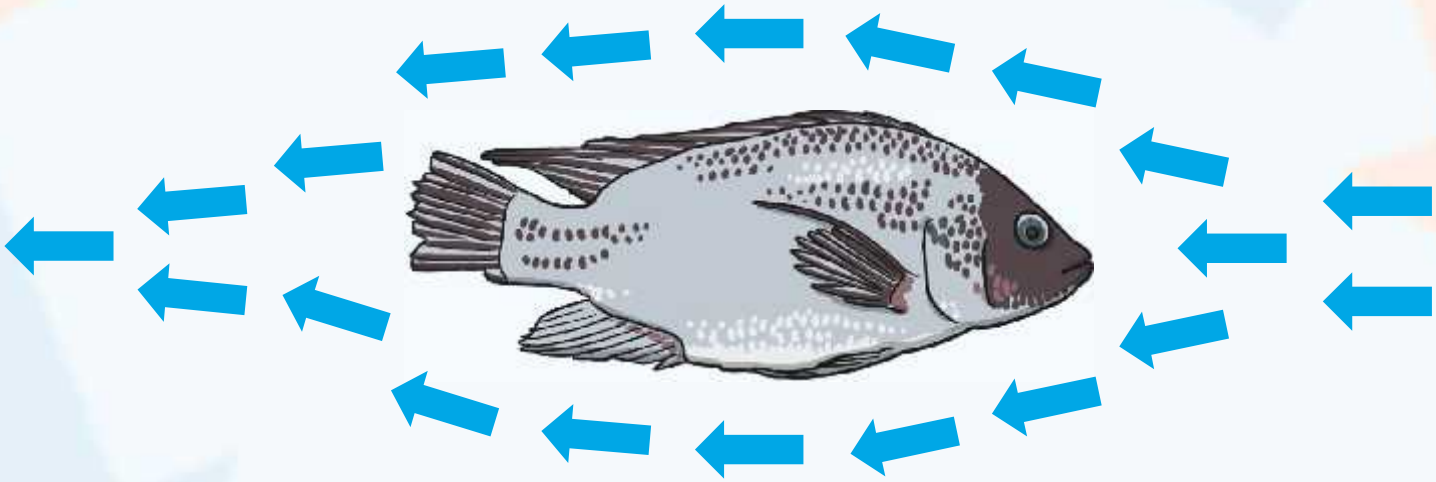
Can you think of an object that has **little** air resistance and an object that has **a lot**?

What is the name of the **force** that is causing river water to **fall** down this cliff?


How do you think this fish's shape helps it to move easily through the water?

Introduction

The fish's shape is **streamlined** to help it move easily through the water.



Just like **air** creates **air resistance**, **water** creates **water resistance** which makes it more difficult for objects to move through the water.

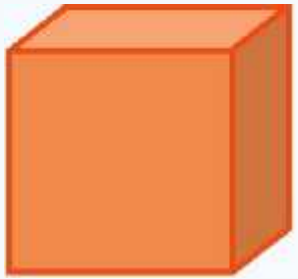
Think about what it is like to walk in deep water. What do you think has **more** resistance, water or air?

Mini Experiment

We have three pieces of plasticine. Each of the pieces are **the same weight but they are different shapes**.

Shape 1

Shape 2



Shape 3

Mini Experiment

Shape 1

Shape 2

Shape 3

We are going to try and find out which shape falls **most quickly** through water. Lets predict which shape will fall most quickly.

Prediction: Text here

Conclusion: Text here

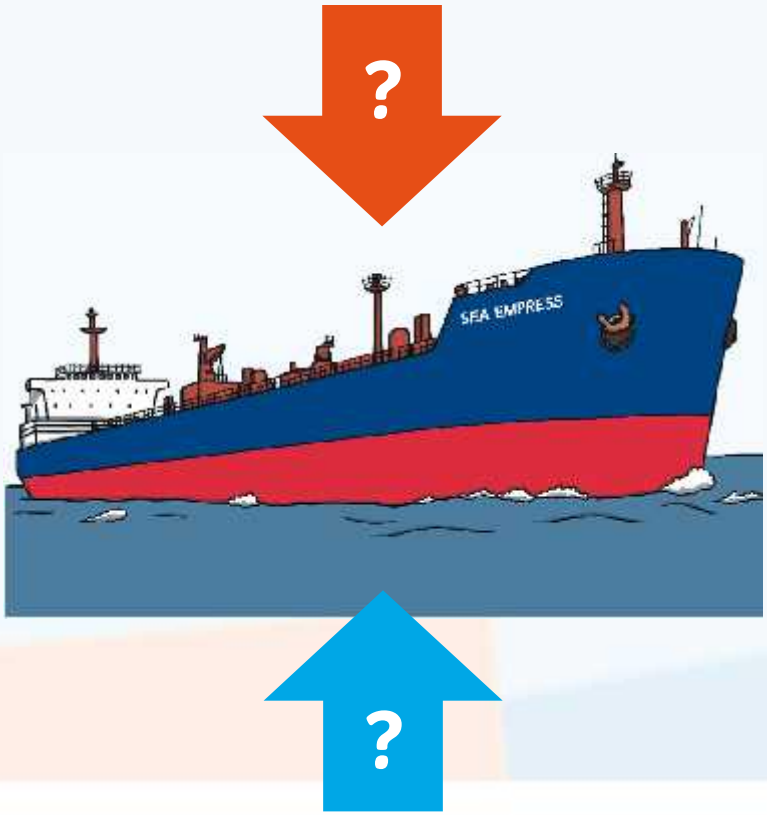
Mini Experiment

Why did the shape of the plasticine affect how fast it fell through the water?

Can you use the words '**water resistance**' in your answer?

Introduction

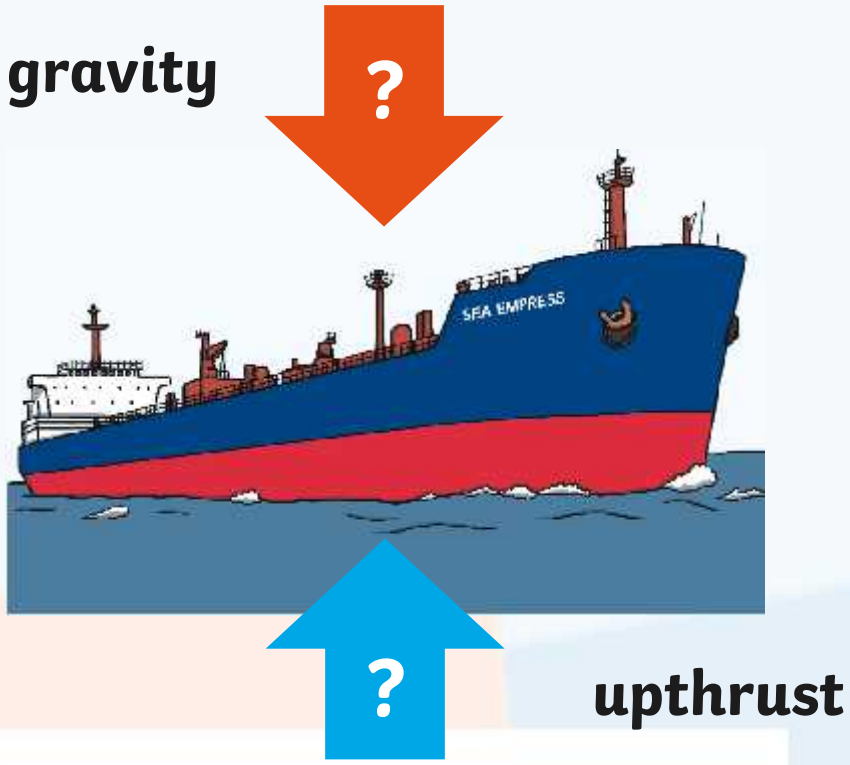
Now lets think about objects that float or sink.
Can you name the force that is pulling the boat downwards?



Introduction

Gravity is pulling the boat downwards.

The upthrust of the water is the force that is pushing the boat upwards.

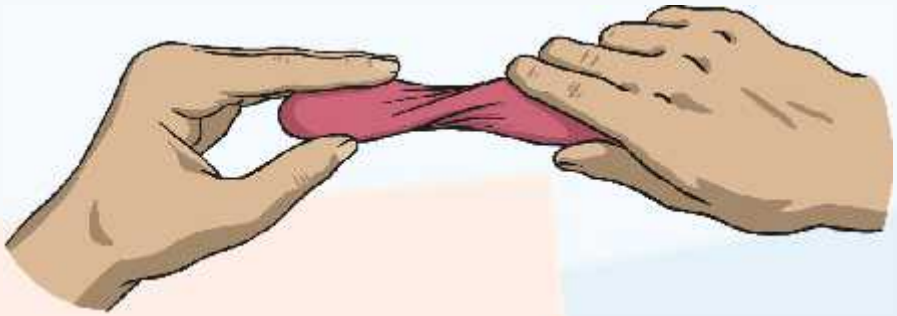


Plasticine Challenge

In our first experiment, our plasticine **sunk** in water. This was because the force of **gravity on the plasticine** was greater than the **upthrust** of the water.

Your first challenge is to mould your ball of plasticine into a shape that will float on the water.

If the plasticine floats, you have managed to balance the forces of upthrust and gravity!



Plasticine Challenge

Your second challenge is to create a boat from your plasticine that will hold as many marbles as possible.

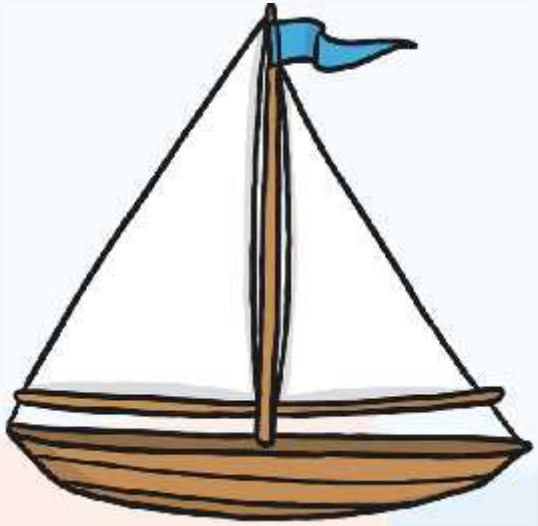
The winner will be the boat that holds the most marbles without sinking.

You can remould your plasticine as many times as you want in the time available.

Plenary

Bring your most successful plasticine boat design to the front table and remember how many marbles it held.

What do you notice about the most **successful designs**?



Plenary

Can you complete these sentences?

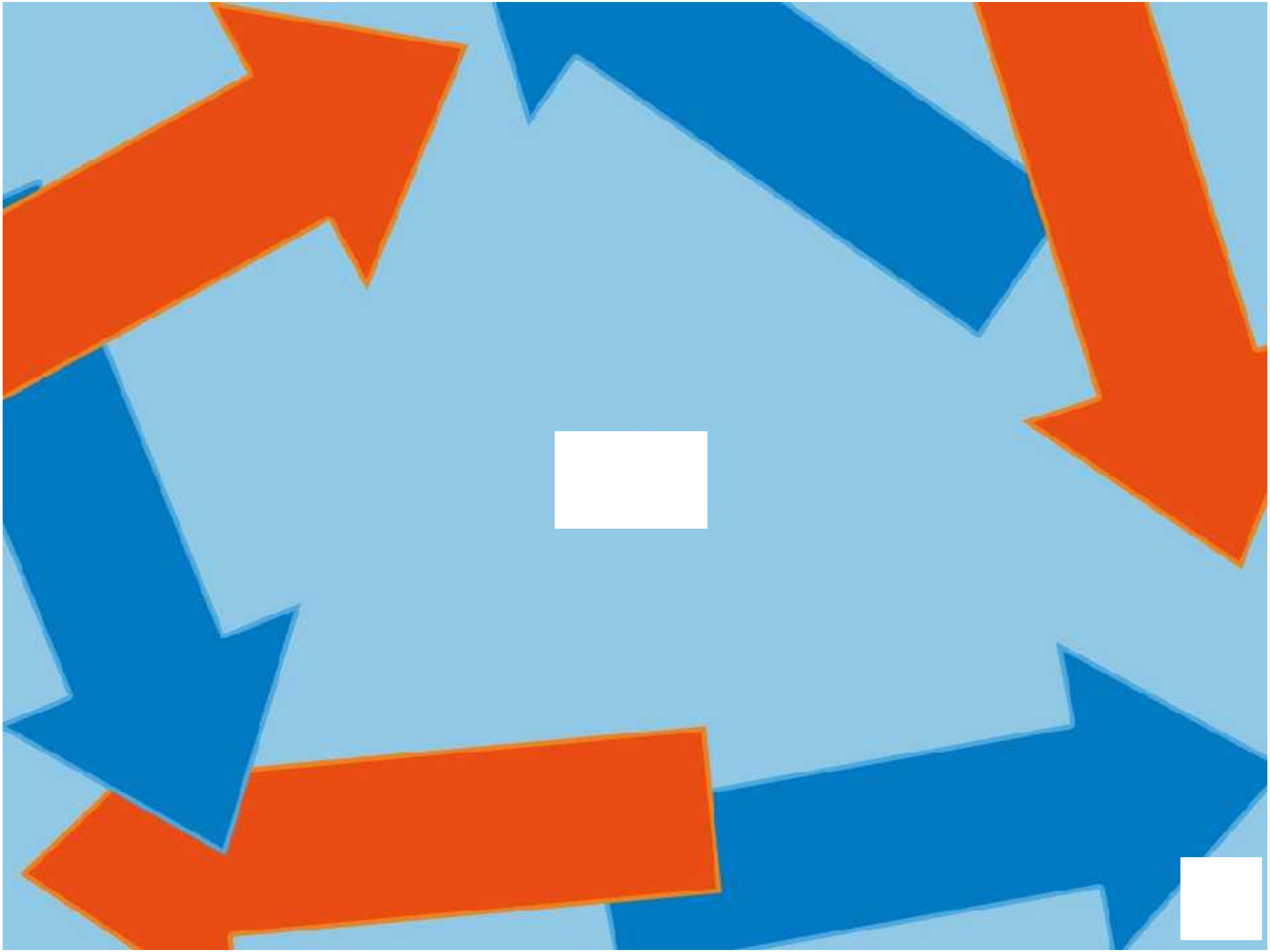
Gravity was pulling down on the plasticine boats.

Upthrust was pushing up on the plasticine boats.

Challenge

When I added marbles into my boat the weight of my boat _increased_.

When my boat sank, the force of _gravity_ on the boat was greater than the _upthrust_ of the water.



Water Resistance and Upthrust: Teacher notes

LO: To understand the relationship between gravity and the upthrust of water.

- To know that water resistance is a type of friction, which is a force.
- To understand that water resistance can slow objects down in water.
- To know what is meant by the word 'upthrust'.

Mini-experiment:

The purpose of this experiment is to teach the children that more streamlined shapes are less affected by water resistance. Try predicting, conducting and concluding this experiment as a class, leaving plenty of space for the children to discuss their ideas and reasoning.

You will need:

- A water beaker
- Plasticine
- Digital weighing scales

Mini-experiment:

The purpose of this challenge is for the children to experience first-hand the relationship between gravity and upthrust.

As they increase the weight of their boat with marbles they will need to increase the surface area of their boat, balancing the forces of gravity and upthrust.

You will need (for each group):

- A water bath
- Plasticine (equal weight for each group)
- Digital weighing scales
- Marbles (of equal weights)