

Ferry Forces!

What can you learn about Water Resistance, Air Resistance and Friction?

Student Introduction

- ▶ You are going to test some different boat shapes to see which will move fastest through water...
- ▶ See how different forces affect your experiment!



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Q1. List 10 things which travel through water or on top of water:

1.	6.
2.	7.
3.	8.
4.	9.
5.	10.

Q2. What do all of these things have in common?

Q3. Think about a vessel (boat) you have seen or travelled on. **Draw a picture** of it in the box below.

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Q4. Now add some **arrows** to your picture to show **forces** acting upon the boat.

Q5. List some things that might affect the **speed** of the boat, with reasons why.

Something that might affect the speed	Why it might affect the speed



Boat Race Challenge!

There are lots of different boat races which take place around the world. We are going to have our own!

First you will watch a 5 minute video of the Oxford and Cambridge Boat Race which takes place between two English universities every year. This race first started in 1829 - nearly 200 years ago!

Watch the clip by visiting www.edudest.uk/followup and typing this worksheet's number, **10704**. To save time, start watching the race about 15 minutes from the start. Did you predict the winner?

Brainstorming Time!

Your teacher will now lead a session of "brainstorming" on the whiteboard or blackboard.

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Now that you've had time to think, the class needs to decide on the following:

- ▶ An **EQUIPMENT LIST**.
- ▶ Your **PREDICTION**. Which shape do you think will move fastest and why?
- ▶ A testing **METHOD**. Decide how you will carry out the experiment.
- ▶ How you will record the **RESULTS** of the test.
- ▶ How you will present your **CONCLUSION** at the end of the race.
- ▶ What is required in your **EVALUATION** - was your prediction correct? What might you do differently next time? Which variables were changed during the test?

NOW IT'S BOAT RACE TIME!

Afterwards, think!

How might the experiment have been different...

- ▶ If you had added a fan to simulate a strong sea breeze?
- ▶ If you had a wave machine to simulate stormy seas?
- ▶ If the boat's bottom was covered in barnacles and seaweed?





AFTER YOUR TRIP

Consider different ferry types, and design your own!

Q1. Which of these ferries did you travel on? Tick yours...



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Q2. Estimate how long your ferry crossing took: minutes

Q3. If you had taken the other ferry, do you think the journey time would have been **longer** or **shorter**? Explain your answer.

CHALLENGE!

Your challenge is to design a new and exciting ferry design for Red Funnel. Spend 10 minutes planning your new ferry before you start to draw it.

Things to consider:

- Does it have a specific role or use?
- Will it carry vehicles or passengers or both?
- What materials will it be made of?
- Is it streamline?
- How can I reduce water and air resistance?
- How will it sail in windy or rough sea conditions?

Checklist:

- ✓ Creative design
- ✓ Drawn with a ruler
- ✓ Design features clearly labelled
- ✓ Force arrows and explanations

On a blank sheet, draw your new ferry! Don't forget to be **original** and **think of a name** for your creation!

Your teacher might even send the best designs to Red Funnel for their consideration!

