

Vessel Motion Investigation!

What can you learn about Propulsion, Turning and Stopping?

Student Introduction

- ▶ In this activity you will learn how vessels move and turn!
- ▶ You'll also find out how the Red Funnel ferries move through the water.



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Your teacher may provide you with model boats, or you may be asked to make your own.

www.edudest.uk



If you are making your own boats, use the following website link for help.

Visit www.edudest.uk/followup and type in this document's number, **10708**.

There are lots of useful links which will help with the following tasks.

STEP 1. Use the website shown above to find the template for the "easy" sailing boat model. Build your boat!

STEP 2. You now need to **investigate** different ways (listed below) to make your model boat turn:

- ✓ Adding a sail to your model
- ✓ Make model turbines powered by elastic bands
- ✓ Using an inflated balloon.

STEP 3. **Demonstrate** what you need to do to your model boat to make it turn to the right.

STEP 4. **Research** how to make boats slow down and stop. Search for information about boats driven by **water jets** and those driven by the "*Voith Schneider Propulsion System*".

Now that you have a good understanding of how boats manoeuvre, undertake the next activity during your ferry crossing!



"For every action
there is an equal and
opposite reaction"

- Sir Isaac Newton

ON
BOARD

Quick Comparison

Different boats have different ways of turning and slowing down.

Read the following details about the Red Funnel vessels, then find your own examples.

The **Red Funnel vehicle ferry** is large and heavy, and it's steering and propulsion is controlled by a system of cycloidal drives called the "Voith Schneider Propulsion System".

The much lighter **Red Jet passenger ferry** has two controllable water jets for steering and propulsion.

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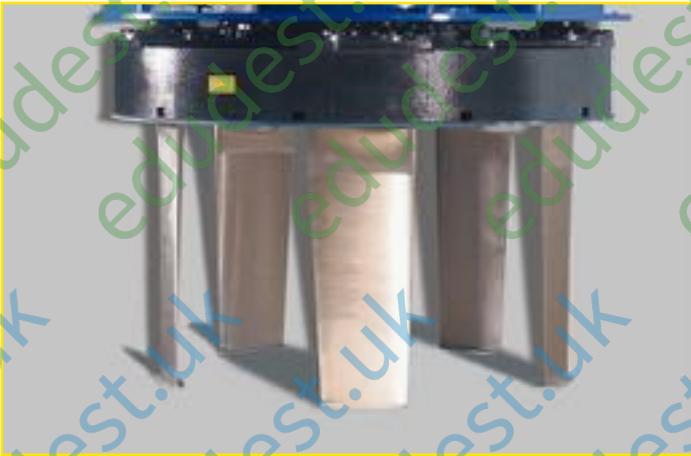
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These *cycloidal* drives are fitted to the hull of the vehicle ferry. They make it very easy to steer the ferry.

When more water is pumped out of the jet on the left side, the boat will move to the right, and vice-versa.



The **Voith Schneider Propulsion System** is able to change the direction of thrust very quickly.

Each of the blades can rotate itself around a vertical axis.

Each blade can therefore produce thrust in any direction.



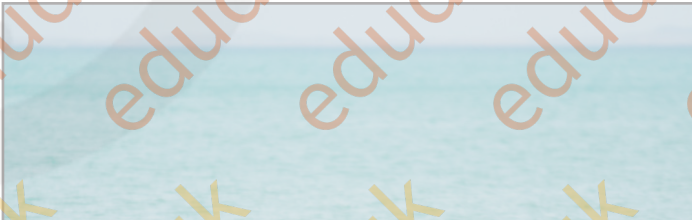
Forces and Movement

ON
BOARD

Look at the following pictures and try to work out how they turn and slow down.

Draw force arrows to show the **direction of the force** and the **direction of the movement**.

Remember Newton's Third Law!



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Rowing Boat

Motor Boat



Trawler

Yacht



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ON
BOARD

Observe and Draw

During your ferry crossing, look out for ships, boats and other users of the water. Choose three to draw, and write a sentence explaining how you think they turn and slow down.



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