

Vessel Motion Investigation!

What can you learn about Propulsion, Turning and Stopping?

Student Introduction

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



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Work through the following 4 steps to learn how boats turn and stop.

www.edudest.uk



The following activities require internet access.

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

All of the links you need will be listed there.

STEP 1. These activities require the use of model boats. Your teacher may provide models, or you can make one of your own. Use the website shown above to look at some suggestions.

STEP 2. You now need to **investigate** different ways (listed below) to make your model boat turn. Again, refer to the website shown above for suitable links.

- ✓ Adding a sail to your model
- ✓ Make model turbines powered by elastic bands
- ✓ Adding a chemical such as soap, washing-up liquid or a mothball to your model boat
- ✓ Using an inflated balloon



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

- Sir Isaac Newton

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. Focus in particular on 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!

ON
BOARD

Propulsion Comparison

Different vessels use different methods of propulsion and steering.

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

The **Red Funnel vehicle ferry** is large and heavy, and its 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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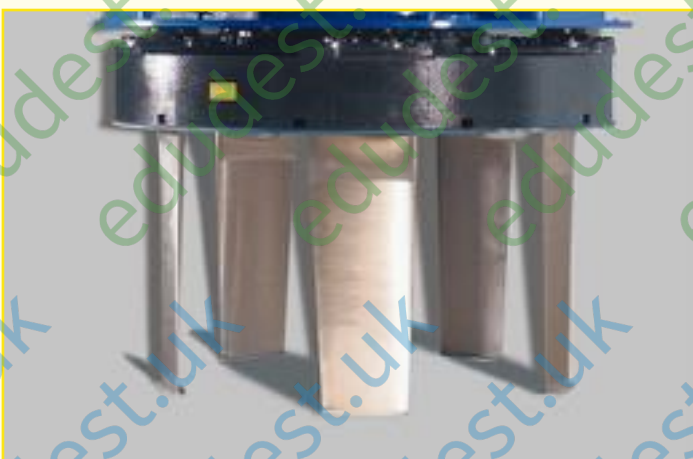
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These cycloidal drives are fitted to the hull of the vehicle ferry. They make the ferry highly manoeuvrable.



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.



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



ON
BOARD

Forces and Movement

Look at the following pictures and identify the direction of force and the direction of movement. Draw arrows. Remember Newton's Third Law!



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Trawler



Yacht



Punt



Chain Ferry



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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, then label with arrows showing direction of force and direction of movement.



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