

## Ferry Motion!

### Speed across the Solent!

#### Student Introduction

- ▶ In this activity you will practise using formulae to calculate the speed of the Red Funnel ferries.



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### REVISION TIME!

The **speed** of an object depends upon the **distance** moved and the **time** taken.

To calculate **speed** you use the formula

$$\text{speed (m/s)} = \text{distance (m)} \div \text{time (s)}$$

or, more usefully when considering long distances and timescales

$$\text{speed (km/h)} = \text{distance (km)} \div \text{time (h)}$$



#### UNITS OF MEASUREMENT

**m** = metres

**km** = kilometres (1km = 1000m)

**s** = seconds

**h** = hours

## TASK

## 1

## Practice Calculations

Let's practise some simple speed calculations!

Complete each of the following problems:

Q1.

- ▶ The distance travelled by the vehicle ferry from Southampton to East Cowes is **18.5km**
- ▶ The average time for this crossing is **1 hour**
- ▶ What is the **average speed** of the ferry?

Show your working out. Remember  $\text{speed} = \text{distance} \div \text{time}$



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ANSWER:

Q2.

- ▶ The Red Jet travels **18.3km** from Southampton to Cowes in **0.5 hours**
- ▶ What is the average speed of the ferry?

Show your working out. Remember  $\text{speed} = \text{distance} \div \text{time}$



ANSWER:

Q3. Fill in the missing word:

The Red Jet passenger ferry crossing is \_\_\_\_\_ times as fast as the Red Funnel vehicle ferry crossing.

## TASK 2

### Introducing Variables

Running a ferry service to timetable is a tricky business!

Consider the following variables and complete the calculations.

Q4.

- ▶ High winds and shipping can affect the speed of the Red Funnel vehicle ferry
- ▶ During Cowes Week there are often hundreds of yachts in the Solent which can slow down the crossing
- ▶ Sometimes the crossing can take as long as **1.2 hours**



▶ Calculate the average speed of the ferry when this

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ANSWER:

Q5.

- ▶ If the wind is favourable, the ferry can increase its average speed to **22 km/h**
- ▶ **Calculate the time taken** for this ferry crossing

Show your working out.

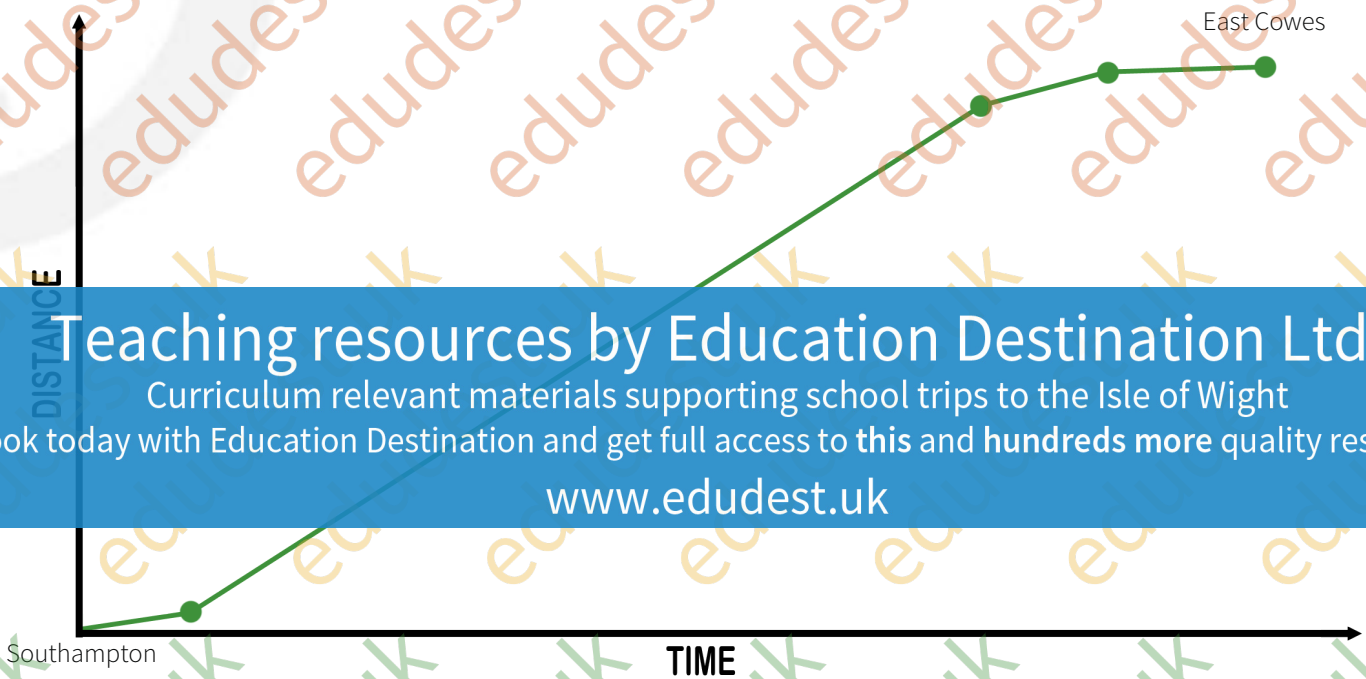


ANSWER:

### TASK 3

## Distance-Time Graphs

The whole journey of a ferry crossing can be represented on a distance-time graph.  
Look at the graph and follow the instructions



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On the graph above, mark the sections with numbers to represent the following.  
You'll also need to put them in the correct order:

1. Ferry **slows down** due to speed restrictions in Cowes Harbour
2. Ferry **accelerates** away from departure terminal at Southampton
3. Ferry **decelerates** into arrival terminal at East Cowes
4. Travelling at a **constant speed** for most of the journey

## Distance-Time Graphs

### TASK

4

Let's draw an approximate distance-time graph for the Red Jet.

Follow the instructions

On the axes below, draw your own distance-time graph showing a Red Jet passenger ferry crossing from Southampton to Cowes.

Remember that the Red Jet accelerates and decelerates faster, travels at a faster constant speed, and therefore has a much shorter journey time compared to the vehicle ferry.

You should also remember that there is no speed restriction in Southampton harbour, but in Cowes there is an 11km/h (6 knot) speed limit in place for the last 5 minutes of the journey.

Add the following numbers to the segments of your graph to show the stages of the journey:

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4. Ferry **decelerates** and stops and arrives at Cowes [www.edudest.uk](http://www.edudest.uk)

