

Outcome	NR6	Student can consistently:	Understand the compound measures of speed, density and pressure.
How the topic is examined	<ul style="list-style-type: none"> Speed problems have been examined at GCSE before. Often questions involving speed are linked to distance-time graphs. Although density has been on the GCSE specification for a while, questions have not been tested that much. Pressure is a new topic on GCSE from this year. Examined through test paper questions and students will not be told the formulae. Questions can appear on calculator and non-calculator papers equally. 		
Prior knowledge	<ul style="list-style-type: none"> Students should be confident with: <ul style="list-style-type: none"> Multiplication and division. Distance-time graphs. Rearranging formulae and solving equations. Substituting into a formula. Volume. 		
Suggested tuition approaches	<ul style="list-style-type: none"> Students need to know the formulae for these three compound measures. $Speed = \frac{Distance}{Time} \qquad Density = \frac{Mass}{Volume} \qquad Pressure = \frac{Force}{Area}$ <ul style="list-style-type: none"> Students often use the formula triangles to help them work out calculations. To work out the speed from a distance-time graph, you should look to find the gradient of the line. 		

	<div data-bbox="752 240 1783 496" data-label="Diagram"> </div> <ul style="list-style-type: none"> • Questions involving speed can often be used alongside a distance-time graph. So students would have to read the values off the graph first. • Units are key in these formulae. The question will request particular units (e.g. for speed miles per hour or pressure newton per m²). It is useful for student to convert numbers to these units before doing any calculation. • For example if a question wants miles per hour as the answer and you have 45 minutes encourage students to change this to 0.75 hours before doing any calculation.
<p>Common errors and misconceptions</p>	<ul style="list-style-type: none"> • Density is denoted by p and pressure is denoted by P. It can be easy to confuse. Some teachers and students choose to use D for density. • Students struggle converting units of time. (e.g. 1 hour 30 mins. Many students put this as 1.3 hours instead of 1.5 hours) • Students mix up formulae. They also divide the wrong way around. To avoid this try to get students to look at the units of the answer. If they want miles per hour, this means distance (miles) divided (per) by time (hour). • If asked to work out the distance at a particular time on a distance time-graph, students don't realise they have to work out the gradient of the whole line.
<p>Suggested resources</p>	<ul style="list-style-type: none"> • Questions <ul style="list-style-type: none"> ◦ http://www.cimt.org.uk/projects/mepres/book7/bk7i22/bk7_22i5.htm (Density) ◦ http://www.cimt.org.uk/projects/mepres/allgcse/bkb7.pdf Density) (pp 68-71) ◦ http://www.cimt.org.uk/projects/mepres/book8/bk8_18.pdf (Speed) • Past GCSE questions <ul style="list-style-type: none"> ◦ https://www.tes.co.uk/teaching-resource/gcse-exam-questions--speed-distance-time-6152169 ◦ https://www.tes.com/teaching-resource/density-questions-for-maths-gcse-11290304 (free account required)