Scheme of Learning: Year 9 Summer Term

Topic Sequence: Reasoning with Proportion

12	13	14
Enlargement and Similarity	Solving Ratio and Proportion problems	Rates

Topic Overview: Rates

Students develop their knowledge of inverse relationships to explore speed, distance and time in detail. They will also look at graphs and the link between speed/distance/time formular and density/mass/volume. Students go on to explore other compound units including exploring flow problems such as how long it will take to fill/empty tanks of different shapes at different rates.

Learning Sequence:

Solve speed, distance and time problems without a calculator
Students will work on speed, distance and time problems that can be solved without a calculator. Key points such as 60mp/h means 60 miles travelled in 1 hour, and that 1 hour 15minutes is 1.25 hours will be covered to help reduce mistakes and errors.

Solve speed, distance and time problems with a calculator
Building upon the previous step, a formal method of converting time with a calculator will be learnt. Students will also need to be able to confidently be able to rearrange an equation with the structure $a = \frac{b}{x}$ to find the unknown. Using this knowledge students will solve more complex speed, distance and time questions.

Use distance-time graphs
Students will begin by learning what the different line segments on a distance/time graph represent. They can also link they knowledge of gradients to determine where different line segments represent the same speed. Students will then also learn how to draw accurate distance/time graphs.

Solve problems with density, mass and volume
Students will look at problems involving density, mass and volume. Linking back to speed units (such as miles 'per' hour) will help students understand the units used in this section, such as g/cm^3 (grams 'per' cubic centimetre). Students will also practice substitution into a formula.

Solve flow problems and their graphs
Students will start by comparing different shaped and sized containers and considering what the difference to the rate that they will fill or drain will be. They will identify which containers will fill at a constant rate (that will be represented by a straight line graph) compared to those that will fill at a varying rate (represented by a curve). Students will then look at solving flow problems, thinking about units as in the previous steps.

Rates of change and their units
This step gives students time to explore the units involved in rates of change questions. Interpreting the gradient of a graph in a given context is important in supporting students to connect the rate of change to gradient.

Convert compound units (H)
Students will begin by looking at the units in a given question and determining which units must be converted to solve the problem to plan their solution. Students will then work through questions on a step by step basis, changing units suck as metres per second to metres per minute, metres by hour then km per hour.

Sequence of Learning:	
1	Solve speed, distance and time problems without a calculator
2	Solve speed, distance and time problems with a calculator
3	Use distance-time graphs
4	Solve problems with density, mass and volume
5	Solve flow problems and their graphs
6	Rates of change and their units
7	Convert compound units (H)

Topic Resources:	
Knowledge Maps:	Ratio and Scale
Assessment	
Knowledge:	End of Topic test
Application of Knowledge:	Termly mixed topic assessment
Supportive Reading:	
	Sparx Maths www.sparxmaths.co.uk
	Corbett Maths : www.corbettmaths.com
	AQA Revision Guide