Scheme of Learning: Year 10 Spring Term

Topic Sequence: Proportions and proportional change

8	9	10	11
Ratio and Fractions	Percentages and Interest	Probability	*Rates*

Topic Overview: Rates

Students recap previous work on rates including metric and imperial conversions and converting currency and 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 and other compound measures: 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. Students also consider other compound measures for example, pressure, fuel consumption and population density*

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: 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 such as metres per second to metres per minute, metres by hour then km per hour.

Income and rates of pay: Students to be introduced to the key concepts of: Gross pay (the full amount paid to an employee before any deductions are made), deductions (income tax, national insurance and sometimes pension contributions) and Net pay (what's left after deductions have been made from gross pay. This is the amount an employee actually receives.)

Financial statements: Financial maths is needed for all jobs, from calculating wages to working out profit, loss and VAT. Knowledge of financial maths is also required to be able to understand bank statements and savings. Students will apply mathematics and percentages to a real life context. This is an opportunity for students to see examples of household bills, financial lenders and the application of interest.

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 and other compound measures
5	Solve flow problems and their graphs
6	Rates of change and their units
7	Convert compound units
8	Income and rates of pay
9	Financial Statements

Topic Resources:

Knowledge Maps:	Compound and non-compound measures Ratio and Scale

Assessment

Knowledge:	End of Topic Test – 8 questions, 20 marks
Application of Knowledge:	Termly Summative Assessments

Supportive Reading:

	Sparx Maths www.sparxmaths.co.uk
	Corbett Maths : www.corbettmaths.com
	AQA Revision Guide