Topic Sequence: Proportions and proportional change

8	9	10	11
Ratio and fractions	Percentages and Interest	Probability	Rates

Topic Overview: Percentages

Although percentages are not specifically mentioned in the KS4 national curriculum, they feature heavily in GCSE papers and this block builds on the understanding gained in KS3. Calculator methods are encouraged throughout and are essential for repeated percentage change/growth and decay problems. Use of financial contexts is central to this block, helping students to maintain familiarity with the vocabulary they are unlikely to use outside school.

Learning Sequence:

Work out percentages of amounts (with and without a calculator) (R): Students need to be familiar with the use of calculator as well as mental and written methods. It is also worth looking at multiple methods for a series of calculations to help students decide which methods are most appropriate in a situation. Finding percentages greater than 100% is a useful lead in to reviewing percentage increase in the next step.

Increase and decrease by a given percentage (R): This step will be done with and without a calculator. Some students get confused when reducing by a given percentage and use the wrong multiplier; the use of estimation is a good strategy here. Confidence with using multipliers is essential for the following steps so it is worth exploring changes of e.g. 3% or 2.7% to avoid over-reliance on mental "build-up" methods.

Express one number as a percentage of another (R): Students will learn how to express a quantity as a percentage of another. Students are sometimes challenged when asked to express something as a percentage, rather than the more regular finding of a percentage. Encouraging students to express as a fraction first and then considering how to convert is also useful

Calculate simple and compound interest: A useful strategy for helping students to distinguish and remember the difference between simple and compound interest is to compare them alongside each other rather than just looking at them independently. The strategy for compound interest is identical to that of all repeated percentage changes and so will be revisited in many of the upcoming steps.

Repeated percentage change: This builds on the previous step, generalising the method for compound interest to any repeated percentage change situation, including repeated reduction. Students may not be aware of the term "depreciation". It is worth considering cases of e.g. an increase of x% followed by a decrease of x% and showing that this does not return to the original value. This is also a good preparation for the next step.

Find the original value after a percentage change (R): Although this will have been covered in KS3, it is worth revisiting as students often make errors such as taking the required percentage off the final value. It is worth looking at multiple methods such as finding 10% or 1% from the given value or using equations of the form "Original × Multiplier = Final Value"

Solve problems involving growth and decay: This step builds on repeated percentage change, again looking at a variety of contexts. There are no new techniques, but students may need to be directed to the links with compound interest and depreciation using the vocabulary of "growth" and "decay". Higher tier students could also consider "working backwards", finding the original value after repeated percentage changes, combining the last two steps

Iterative processes (H): Iterative methods for solving equations are covered in year 11 but here pupils are introduced to the notation in the context of repeated change, and also links to the vocabulary of sequences.

Problems with FDP and ratio: This step provides a link with the previous block of learning

Profit and loss and Percentage Profit: Students to apply skills of percentage changes, choosing the correct numbers to take as 100% or as a whole, including simple problems and applying it to the real life context of profit and loss.

Profit and loss (problem solving): This is another opportunity for students to practise interpretation of questions so that they can choose the correct method. They should look at a variety of situations including the 'reverse' percentage questions just studied mixed with percentage increase, decrease, finding a percentage and expressing as a percentage

Sequence of Learning:	
1	Work out percentages of amounts (with and without a calculator)
2	Increase and decrease by a given percentage
3	Express one number as a percentage of another
4	Calculate simple and compound interest
5	Repeated percentage change
6	Find the original value after a percentage change
7	Iterative processes
8	Solve problems involving growth and decay
9	Problems with FDP and ratio
10	Profit and loss and Percentage profit
11	Profit and loss (problem solving)

Topic Resources:

Knowledge Maps:	FDP Conversions Percentages

Assessment:

Knowledge:	End of topic assessment
Application of Knowledge:	Termly summative assessment

Supportive Reading:

Any supported reading listed here	Sparx Maths www.sparxmaths.co.uk
	Corbett Maths : www.corbettmaths.com
	AQA Revision Guide