Topic Sequence: Applications of Number

6	7	8
Solving problems with addition and subtraction	Solving problems with multiplication and division	Fractions and Percentages of amounts

Topic Overview: Solving problems with addition and subtraction

The focus is building on the formal methods of addition and subtraction students have developed at Key Stage 2. All students will look at this in the context of interpreting and solving problems, for those for whom these skills are secure, there will be even more emphasis on this. Problems will be drawn from the contexts of perimeter, money, interpreting bar charts and tables and looking at frequency trees; we believe all these are better studied alongside addition and subtraction rather than separately. Calculators should be used to check and/or support calculations, with significant figures and equations explicitly revisited.

Learning Sequence:

Properties of addition and subtraction Students will know from earlier study that addition and subtraction are inverses, and that addition is commutative but subtraction is not. This step reinforces these concepts and the associated language and encourages multiple representations of calculations to deepen understanding. It is useful to extend this to algebraic expressions and also to use the associative law to simplify calculations

Mental strategies This step looks at ways students can develop their flexibility and efficiency in mental addition and subtraction calculations. Increased flexibility in their choice of strategy is developed through regular discussion and comparison of different approaches.

Formal methods: adding integers For students who are confident with the formal method of addition, this small step will provide practice and revision. Students who find this more challenging will have the opportunity to revisit with concrete materials alongside the formal methods to develop their understanding

Formal methods: adding decimals Students will build on the previous small steps on addition, making use of estimations and the column method paying particular attention to alignment and the use of placeholders. It is also a good opportunity to revisit the meanings of tenths and hundredths and to build on last terms work of decimal and fraction equivalence and earlier work on algebraic substitution

Formal methods: subtracting integers Following on from previous steps, the use of the formal method of subtraction needs a good understanding of how and when to exchange e.e. one ten for ten ones. Setting questions in the context of equations and checking addition will reinforce the concept of inverse operations

Formal methods: subtracting decimals The clear links to the formal method of subtraction of integers and to the addition of decimals will be emphasised. In particular, the use of zeros as placeholders. Although the emphasis is on the formal method there will be discussion on alternate methods that could or should be used

Choosing the appropriate method: As well as flexibility in applying methods, students will be encouraged to choose which method to apply in which situation – mental, jottings, formal or calculator. The discussion as to which method can draw out or lead to understanding of the method themselves and this is sometimes as powerful as practice itself

Solve problems with perimeter Students will be familiar with perimeter from primary school. This step is an opportunity to revisit the concept and solve addition and subtraction problems in context. This is also an opportunity to revise forming and solving one step equations and/or simplifying and substituting into expressions

Solve financial problems This step uses addition and subtraction, particularly in a familiar context whist also introducing new vocabulary. Students may practice calculator and non-calculator skills as appropriate following previous learning. Estimation and checking answers on a calculator will support entering values some of which are pounds and some in pence and interpreting displays such as 14.4

Tables and timetables Reading tables is a key life skill and provides a good context for practicing addition and subtraction skills. Calculations with time can create difficulties as students are not used to working non-decimal contexts

Frequency trees These provide a good opportunity for students to practice addition and subtraction in a different context, Links can be made to using tables in the previous step and to the part-whole model. Students can be challenged to create their own questions to investigate the minimum amount of information needed to complete a frequency tree.

Bar charts and line charts Students are very familiar wit the construction of bar and line charts so the foci of this step will be the interpretation of ready drawn diagrams and linking different forms of charts to tables. As well as opportunities to solve addition and subtraction problems, the notation of scaled axes will be discussed making links with intervals on number lines

Add and subtract in standard form (H) In this step students will have the opportunity to revisit standard form notation through exploring addition and subtraction, noticing that adding powers is an incorrect approach. It is also a good opportunity to consolidate knowledge of working with billions and rounding to one significant figure.

Sequence of Learning:	
1	Properties of addition and subtraction
2	Mental strategies for addition and subtraction
3	Use formal methods for addition of integers
4	Use formal methods for addition of decimals
5	Use formal methods for subtraction of integers
6	Use formal methods for subtraction of decimals
7	Choose the most appropriate method: mental strategies, formal written or calculator
8	Solve problems in the context of perimeter
9	Solve financial maths problems
10	Solve problems involving tables and timetables
11	Solve problems with frequency trees
12	Solve problems with bar charts and line charts
13	**Add and subtract numbers given in standard form (H)**

Topic Resources:

Knowledge Maps:	Place Value Decimals

Assessment:

Knowledge:	End of Topic test
Application of Knowledge:	Termly mixed topic assessment

Supportive Reading:

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