Topic Sequence: Directed Number and Fractional Thinking

9	10
Operations and equations with directed number	Addition and subtraction of fractions

Topic Overview:

This block builds on the Autumn term study of "key" fractions, decimals and percentages. It will provide more experience of equivalence of fractions with any denominators, and to introduce the addition and subtraction of fractions. Bar models and concrete representations will be used extensively to support this. Adding fractions with the same denominators will lead to further exploration of fractions greater than one, and for the Core strand adding and subtracting with different denominators will be restricted to cases where one is a multiple of the other.

Learning Sequence:

Representations of fractions: Students will be presented with and expect to represent fractions in several ways to ensure conceptual understanding of what a fraction is and flexibility between forms. Emphasis will be placed on the need for equal parts which will be explored by exempla questions. Number lines will be used to help reinforce that a fraction is a number with a position on the number line.

Convert mixed numbers Students will understand conceptually what a fraction is. A common misconception is that a fraction is part of a whole so it will be reinforced that a fraction can be greater than one. Bar models and number lines will be used to build conceptual understanding on how many wholes are and what the fractional part is remaining.

Add and subtract unit fractions In this step the students build their conceptual understanding of what it means to add and subtract fractions. The emphasis will be on adding and subtracting unit fractions so bar models will be used to to represent the split. Common misconceptions will be addressed here.

+/- fractions- same denominator This step helps to reinforce the idea of adding and subtracting a given number of equal parts. This will help their understanding the need for a common denominator. Cuisenaire rods, bar models and number lines maybe used to represent alongside the abstract calculation. Conversion between mixed numbers and improper fractions is revisited.

+/- fractions from integers Students begin to subtract a fraction from a whole. They can use portioning to subtract from other integers e.g $4 - \frac{2}{5} = 3 + 1 - \frac{2}{5} = 3\frac{3}{5}$. Students will consider to use bar models and number lines to support their thinking and conceptually understanding.

Equivalent fractions Students will have some prior experience of equivalent fractions. The relationship between the numerator and denominator will be explored. The relationship between the numerator and denominator with two equivalent fractions will also be explored.

+/- fractions – common multiples Students will build from their knowledge of lowest common multiple and adding and subtracting fractions with the same denominator. An explicit connection will be made to the earlier step and how finding a common denominator aids in addition and subtraction of fractions.

+/- fractions – any denominator In this step students will use equivalent fractions for both fractions in order to calculate. They will use their knowledge from the previous steps to extend to add and subtract fractions with any denomination. Pictorial representations maybe used to help.

+/- fractions – improper and mixed Students will explore different ways of adding and subtracting mixed numbers so they can be flexible when choosing methods. If students are confident with directed numbers then negative fractions maybe introduced.

Fractions in algebraic contexts This step will give students the opportunity to interleave the previous unit of algebraic thinking in the context of fractions further deepening their understanding of both. Substitution, sequences, function machines and solving are all explored within the exemplar questions.

+/- fractions and decimals This step gives the students the opportunity to revisit fraction and decimal equivalence in the context of addition and subtraction reinforcing all the skills involved. Students will be encouraged to estimate before they calculate in order to avoid misconceptions e.g $0.5 + 6/10 = 0.11$

+/- algebraic fractions (h) Students will further deepen their understanding of fractions within the context of algebra. The students will compare adding expressions with fractions to those adding those integer form.

Sequence of Learning:

1	Understand representations of fractions
2	Convert between mixed numbers and fractions
3	Add and subtract unit fractions with the same denominator
4	Add and subtract fractions with the same denominator
5	Add and subtract fractions from integers expressing the answer as a single fraction
6	Understand and use equivalent fractions
7	Add and subtract fractions where denominators share a simple common multiple
8	Add and subtract fractions with any denominator
9	Add and subtract improper fractions and mixed numbers
10	Use fractions in algebraic contexts
11	Use equivalence to add and subtract decimals and fractions
12	**Add and subtract simple algebraic fractions (H)**

Topic Resources:

Knowledge Maps:	Fractions

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