Mathematics	**Y11 Foundation**	Chapter 18 (N2, N3, N7,N8, N9)	**The Bigger Picture: Fractions and standard form**	**Lessons 20**

Essential Knowledge	**Teaching Points**
- Add and subtract mixed number fractions; - Multiply mixed number fractions; - Divide mixed numbers by whole numbers and vice versa; - Find the reciprocal of an integer, decimal or fraction; - Understand 'reciprocal' as multiplicative inverse, knowing that any non-zero number multiplied by its reciprocal is 1 (and that zero has no reciprocal because division by zero is not defined). - Use index laws to simplify and calculate the value of numerical expressions involving multiplication and division of integer powers, fractions and powers of a power; - Use numbers raised to the power zero, including the zero power of 10; - Convert large and small numbers into standard form and vice versa; - Add and subtract numbers in standard form; - Multiply and divide numbers in standard form; - Interpret a calculator display using standard form and know how to enter numbers in standard form.	- Regular revision of fractions is essential. - Demonstrate how to the use the fraction button on the calculator. - Use real-life examples where possible. - Negative fractional indices are not included at Foundation tier, but you may wish to extend the work to include these. - Standard form is used in science and there are lots of cross curricular opportunities. - Students need to be provided with plenty of practice in using standard form with calculators.

Assumed Prior Knowledge/ Links / Interleaving	
- Students should know how to do the four operations with fractions. - Students should be able to write powers of 10 in index form and recognise and recall powers of 10, i.e. $10^2 = 100$. - Students should recall the index laws.	

Potential Barriers to Access /Misconceptions	**Opportunities for Reasoning/Problem Solving/Proofs**
- The larger the denominator the larger the fraction. - Some students may think that any number multiplied by a power of ten qualifies as a number written in standard form. - When rounding to significant figures some students may think, for example, that 6729 rounded to one significant figure is 7.	- Students should be able to justify when fractions are equal and provide correct answers as a counter-argument. - Links with other areas of mathematics should be used where appropriate to embed the notion that fractions are not just used in isolation, e.g. use 6 ½ cm instead of 6.5 cm. - Link with other areas of mathematics, such as compound measures, by using speed of light in standard form.

Key Mathematical Vocabulary	Add, subtract, multiply, divide, mixed, improper, fraction, decimal, indices, standard form, power, reciprocal, index