Scheme of Learning: Year 8 Spring Term

Topic Sequence: Developing Number

10	11	12
Fractions and Percentages	Standard Index Form	Number Sense

Topic Overview: Standard Index Form

Students have already briefly looks at standard form in Year 7 and now this knowledge is introduced in more detail, building from their earlier work on indices last term. The use of context is important to help students make sense of the need for the notation and its uses. The Higher strand includes a basic introduction to negative and fractional indices

Lesson Sequence:

Investigate positive powers of 10
Using experimentation students will explore powers of ten. This recaps and builds on students' understanding from the indices unit and work from year 7.

Work with numbers greater than 1 in standard form
Students will now write large numbers in standard form. Students should be exposed to correct examples in the form $A \times 10^n$ where A is a number between 1 and 10 and n is an integer. It is important to look at how standard form works rather than just counting zeros.

Investigate negative powers of 10
During this step students will look at decreasing powers of ten then investigate what happens if you get to 1 and below. Time should be spent discussing and also investigating 10^0 and explore misconceptions such as $10^0 = 0$ and $10^{-2} = -100$ .Students should also be confident working between standard form, decimals and fraction equivalences.

Work with numbers between 0 and 1 in standard form
Once negative powers are understood, students can explore the patterns and connections between decimal numbers and standard form.

Compare and order numbers in standard form
Students will order numbers given in words, standard form and ordinary form. Strategies for comparing numbers, such as considering the exponent of 10 as an initial check should be discussed.

Mentally calculate with numbers in standard form
Using simple numbers, students will complete mental calculations where one number in standard form is multiplied or divided by an integer. The result may no longer be in standard form.

Add and subtract numbers in standard form
Students will compare strategies for addition and subtraction without a calculator. There is a risk of just adding the numbers and adding the powers separately and students may prefer to always convert to ordinary numbers.

Multiply and divide numbers in standard form
Students will explore the use of commutativity to multiply and divide numbers given in standard form. Their earlier work on indices and dealing with answers like 30×10^7 should have prepared them for this step.

Use a calculator to work with numbers in standard form
All four operations will be explored, and students can further their knowledge of calculators to use the memory and exponent functions. Alternative methods to the answer to the same question could be shown on the calculator, such as using the fraction button for division.

Understand and use negative indices
Students will build on their understanding of negative powers of 10 to explore negative indices generally.

Understand and use fractional indices
Here students will begin working with fractional indices, finding the square roots and the cube roots of numbers.

Sequence of Lessons:		Topic Resources:	
1	Investigate positive powers of 10	**Knowledge Map:**	Index Numbers
2	Work with numbers greater than 1 in standard form		Standard Form
		Assessment:	
3	Investigate negative powers of 10	**Knowledge:**	End of Topic test
4	Work with numbers between 0 and 1 in standard form		
5	Compare and order numbers in standard form		
6	Mentally calculate with numbers in standard form	**Application of Knowledge:**	Termly mixed topic assessment
7	Add and subtract numbers in standard form		
		Supportive Reading:	
8	Multiply and divide numbers in standard form	**Any supported reading listed here**	Sparx Maths www.sparxmaths.co.uk
9	Use a calculator to work with numbers in standard form		Corbett Maths : www.corbettmaths.com
10	Understand and use negative indices		
11	Understand and use fractional indices		AQA Revision Guide