



The Sutton Academy

Knowledge Rich Curriculum Plan

Year 8 Support – Powers, Root and Calculations

Lesson/Learning Sequence	Intended Knowledge: <i>Students will know that...</i>	Tiered Vocabulary	Prior Knowledge: <i>In order to know this, students need to already know that...</i>	Assessment
<p>To learn how to calculate powers and roots.</p>	<ul style="list-style-type: none"> • Students will know how to use integer powers of 2, 3, 4, 5. • Students will know how to calculate square roots of numbers. • Students will know how to calculate cube roots of numbers. • Students will know that powers and their subsequent roots are inverse operations of one another • Students will know how to find the value of a negative number raised to an integer power. • Students will understand why we can only find certain roots for negative numbers. 	<p>Index – An index, or a power, is the small floating number that goes next to a number or letter</p> <p>Square – When you are asked to square a number you are being asked to multiply it by itself</p> <p>Square numbers – The result when you multiply a number by itself</p> <p>Cube – When you are asked to cube a number you are being asked to multiply it by itself three times!</p> <p>Cube Numbers – The result when you cube a number</p> <p>Square Root - This is the number that is multiplied by itself to get a square number!</p> <p>Cube Root - This is the number that is multiplied by itself three times to get a cube number!</p> <p>Reciprocal – The reciprocal of a number is 1 divided by the number</p>	<ul style="list-style-type: none"> • Students should already know how to square a number 	<p>Mini-Assessment 2</p>
<p>To learn how to use the order of operations.</p>	<ul style="list-style-type: none"> • Students will know how to know and identify different aspects of BIDMAS. • Students will know how to use BIDMAS to solve a calculation. • Students will know how to use BIDMAS to solve calculations involving indices. • Students will know that division and multiplication are interchange operations. • Students will know that when a calculation has only addition and subtract involved that they must calculate from left to right. 	<p>Index (plural indices) – An index, or a power, is the small floating number that goes next to a number or letter</p>	<ul style="list-style-type: none"> • Students need to know how to calculate powers and roots of integer numbers. • Students need to know how to add, subtract, multiply and divide integer numbers. 	<p>Mini-Assessment 2</p>
<p>To learn how to round to the nearest 10, 100, 1000 and to a given number of decimal places.</p>	<ul style="list-style-type: none"> • Students will know how to round to the nearest 10, 100, 1000. • Students will know how to round to the nearest whole number. • Students will know how to round to a given number of decimal places 	<p>Rounding – making a number simpler but keeping its value close to what it was. The result is less accurate, but easier to use</p>	<ul style="list-style-type: none"> • Students need to know how to identify the place value of a digit within a number. 	<p>Mini-Assessment 2</p>
<p>To learn how to round to a given number of significant figures.</p>	<ul style="list-style-type: none"> • Students will know that significant figures are the digits in a number that contribute to the degree of accuracy of the value and that we start counting significant figures at the first non-zero digit – the digit with the most value. • Students will know that non-zero digits are always significant. • Students will know that zeros between non-zero digits are always significant. • Students will know that leading zeros are never significant. • Students will know how to round to one significant figure. • Students will know how to round to two significant figures. • Students will know that their rounded value will be similar to their original value – they can use this to check answers. 	<p>Significant – sufficiently important to be worthy of attention</p> <p>Significant figures – the digits in a number that contribute to the degree of accuracy of the value and that we start counting significant figures at the first nonzero digit</p>	<ul style="list-style-type: none"> • Students need to know how to identify the place value of a digit within a number. • Students need to know how to round to the nearest 10, 100 and 1000. • Students need to know how to round to the nearest decimal place. • Students need to know the basic rules of rounding up and down. 	<p>Mini-Assessment 2</p>

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To learn how to estimate.	<ul style="list-style-type: none"> • Students will know that to estimate a calculation they must first round each number to one significant figure and then use the order of operations to calculate. • Students will know how to estimate calculations involving fractions when the denominator rounds to an integer. 	Estimate – an approximate calculation or judgement of the value, number, quantity, or extent of something.	<ul style="list-style-type: none"> • Students need to know how to round to one significant figure. • Students need to know how to carry out calculations using the order of operations. 	Mini-Assessment 2
To learn how to use a calculator.	<ul style="list-style-type: none"> • Students will know how to use a calculator to solve calculations with all 4 operations. • Students will know that a calculator uses the order of operations. • Students will know how to input fractions into the calculator. • Students will know how to convert fractions to decimals using the standard to decimal button. • Students will know how to calculate numbers with powers. • Students will know how to calculate the roots of numbers. • Students will know how to use a calculator to solve more complex problems involving a mixture of fractions, powers and root. • Students will know how to write the values from the calculator display. • Students will know how to rounded their answers to a given degree of accuracy. 		<ul style="list-style-type: none"> • Students need to know how to round to a given degree of accuracy. 	Mini-Assessment 2
To learn how to find the highest common factor of two numbers.	<ul style="list-style-type: none"> • Students will know how to list all the factors of a number systematically, starting with 1 and itself. • Students will know how to select the correct number from a list of numbers when given descriptions of a number such as 'a factor of ', 'an even factor of', etc. • Students will know that the highest common factor of two numbers refers to the highest numbers that both numbers are divisible by. • Students will know how to find the highest common factor (HCF) of two numbers by listing. <p>Opportunity for challenge:</p> <ul style="list-style-type: none"> • Students will know how to solve HCF problems. 	<p>Common – shared by, coming from, or done by two or more people, groups, or things.</p> <p>Prime Number – In maths, prime numbers are whole numbers greater than 1, that have only two factors: 1 and the number itself.</p> <p>Factor – A factor is a number that divides into a given number without leaving a remainder</p> <p>Highest Common Factor – the largest number that both or all of the numbers can be divided by</p>	<ul style="list-style-type: none"> • Students need to know the difference between odd and even numbers. 	Mini-Assessment 2
To learn how to find the lowest common multiple of two numbers.	<ul style="list-style-type: none"> • Students will know how to list multiples of a numbers, starting with the number itself. • Students will know how to select the correct number from a list of numbers when given descriptions of a number such as 'a multiple of', 'an odd multiple of', etc. • Students will know that the lowest common multiple is the lowest product of each number with an integer. • Students will know how to find the lowest common multiple (LCM) of two numbers by listing. <p>Opportunity for challenge:</p> <ul style="list-style-type: none"> • Students will know how to find the LCM of three numbers • Students will know how to solve a real-life LCM problem. 	<p>Multiple – A multiple is a number in the given number's multiplication tables</p> <p>Lowest Common Multiple – the smallest number that is in both numbers' times tables</p>	<ul style="list-style-type: none"> • Students need to know their multiplication tables 	Mini-Assessment 2

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<p>To learn how to find the product of prime factors.</p>	<ul style="list-style-type: none"> • Students will recognise and recall the first 10 prime numbers. • Students will know how to identify prime numbers from a list by eliminating values known to be non-prime e.g. even numbers (apart from 2) or multiples of 5. • Students will know how to find the product of prime factors for positive integers. • Students will know how to find the product of prime factors giving their answer in index form. • Students will know that the product of prime factors is unique for every number. • Students will know that to check the product of prime factors they multiply their prime factors together and they should get the original number. • Students will know that it doesn't matter which way you break the number down into prime factors the result should be the same. 	<p>Prime Number – In maths, prime numbers are whole numbers greater than 1, that have only two factors: 1 and the number itself.</p> <p>Product – in maths, a product is the result of multiplication</p> <p>Product of Primes – a product in which every factor is a prime number</p>	<ul style="list-style-type: none"> • Students should already know what a prime number is and be able to list prime numbers 	<p>Mini-Assessment 2</p>