The Sutton Academy

Knowledge Rich Curriculum Plan

Year 7 Support – Powers and Roots and Calculations

Lesson objective	Intended Knowledge:	Tiered Vocabulary	Prior Knowledge:	Steps to Success	Feedback
To learn how to calculate with powers and roots.	• Students will know how to calculate with an integer power of 2 (Square Numbers) • Students will know how to calculate with an integer power of 3 by multiplying the number by itself twice (cube numbers) • Students will know how to calculate square roots of numbers. • Students will know how to calculate cube roots of numbers. • Students will know the difference between the symbol of a square root and cube root. • Students will know that powers and their subsequent roots are inverse operations of one another	**Indices** – (Plural of index) or powers, are the small floating number that goes next to a number or letter **Square** – When you are asked to square a number you are being asked to multiply it by itself Square numbers – The result when you multiply a number by itself **Cube** – When you are asked to cube a number you are being asked to multiply it by itself three times! **Cube Numbers** – The result when you cube a number **Square Root** - This is the number that is multiplied by itself to get a square number! **Cube Root** - This is the number that is multiplied by itself three times to get a cube number **(Please print these – DO NOT MAKE STUDENTS WRITE THEM OUT)**	• Students need to know how to multiply integers.	To calculate a square number, multiply the integer by itself. e.g. 2 x 2 = 4 To calculate a cube number, multiply the integer by itself twice. e.g. 2 x 2 x 2 = 8	
To learn how to use the order of operations.	• 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. • Students will know how to apply the order of operations to complete simple calculations using BIDMAS. E.g. $3 + 10 \div 5$ **They will not think that division comes before multiplication or addition comes before subtraction.**		• Students need to know how to add, subtract, multiply and divide integer numbers.	**Steps to Success - BIDMAS** **Step 1:** Prioritise any calculation involving brackets. **Step 2:** Next we prioritise any calculation involving indices. **Step 3:** Then Prioritise any calculation involving multiplication; and division (This are interchangeable with each other – You Must answer these going left to right). **Step 4:** Finally, prioritise any calculation involving addition and subtraction (You MUST answer these going left to right).	
To learn how to round to the nearest 10, 100 and 1000.	• Students will know how to round to the nearest 10. • Students will know how to round to the nearest 100. • Students will know how to round to the nearest 1000. • Students will know to identify the number they are rounding to, look at the number to the right of it and decide whether to round up or down. • Students will know to round up if the digit to the right is 5-9. • Students will know to round down if the digit to the right is 0-4.	**Rounding –** making a number simpler but keeping its value close to what it was. The result is less accurate, but easier to use	• Students need to know how to identify the value of a digit within a number.	**Steps to Success - Rounding** **Step 1:** Identify which number you are rounding to. **Step 2:** Look at the number to the right of the one identified. If it is below 5, then we keep the identified digit the same. If it is 5 or more, then we round up the identified digit. **Step 3:** Round down by cutting off the values to the right. Round up by adding one to the identified value. **Step 4:** Check your answer – Does it have a similar value to the number you started with?	

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	• Students will know that to round up they must add one to the number they are rounding to. • Students will know that to round down they must not subtract one from the number they are rounding to. • Students will know that their rounded value will be similar to their original value – they can use this to check answers.				
To learn how to round to the nearest decimal place.	• Students will know how to round to the nearest whole number. • Students will know how to round to a 1 decimal place. • Students will know how to round to 2 decimal places. • Students will know that their rounded value will be similar to their original value – they can use this to check answers.		• Students need to know how to round to the nearest 10/100/1000	**Steps to Success - Rounding** **Step 1:** Identify which number you are rounding to. **Step 2:** Look at the number to the right of the one identified. If it is below 5, then we keep the identified digit the same. If it is 5 or more, then we round up the identified digit. **Step 3:** Round down by cutting off the values to the right. Round up by adding one to the identified value. **Step 4:** Check your answer – Does it have a similar value to the number you started with?	
To learn how to use a calculator.	• 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 write the values from the calculator display. **Opportunity for challenge:** • Students will know how to use a calculator to solve more complex problems involving a mixture of fractions, powers and root.		• Students need to know how to use a calculator to add, subtract, multiply and divide		
To learn how to identify factors, multiples and prime numbers	• Students will know what factors are and be able to list all factors of a number systematically. • Students will know what multiples are and be able to list multiples of a number systematically. • Students will know at least the first 10 prime numbers and be able to identify prime numbers from a list.	**Prime Number** – In maths, prime numbers are whole numbers greater than 1, that have only two factors: 1 and the number itself. **Multiple –** A multiple is a number in the given number's multiplication tables **Factor –** A factor is a number that divides into a given	• Students need to know how to multiple and divide integers.		

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		number without leaving a remainder			
To learn how to find the Highest Common Factor and Lowest Common Multiple of two numbers using lists.	• Students will know how to find the lowest common multiple (LCM) of two numbers by listing. • Students will know how to find the highest common factor (HCF) of two numbers by listing.	Common – shared Highest Common Factor – the largest number that both or all of the numbers can be divided by Lowest Common Multiple – the smallest number that is in both numbers' times tables	• Students need to know how to list the factors of a number. • Students need to know how to list the multiples of a number.	**Steps to Success – Highest Common Factor (HCF) from lists** **Step 1:** List all the factors of both the numbers. **Step 2:** Identify the largest number they both have in common, this is the Highest common factor. **Steps to Success- Lowest Common Factor (LCM) from lists** **Step 1:** List the first 5-10 multiples of both numbers. **Step 2:** Identify the first multiple that is in both multiplication tables, this is the Lowest Common Multiple.	
Mini-Assessment 2					