The Sutton Academy

Knowledge Rich Curriculum Plan

Year 10 Foundation – Number 2

Lesson	Intended Knowledge:	Tiered Vocabulary	Prior Knowledge:	Step to Success	Feedback
To learn how to round to an appropriate degree of accuracy.	• Students will know how to round to a given number of decimal places. • Students will know how to round to a given number of significant figures. • Students will know that nonzero digits are always significant. • Students will know that zeros between nonzero digits are always significant. • Students will know that leading zeros are never significant.	**Rounding –** making a number simpler but keeping its value close to what it was. The result is less accurate, but easier to use **Significant –** important **One significant figure** –the first non-zero digit which has the most value	• Students need to know how to round numbers to the nearest 10/100/1000 etc. • Students need to know how to round to the nearest whole 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?	
To learn how to estimate.	• Students will know how to estimate answers to simple calculations by rounding all of the numbers within a question to one significant figure. • Students will know how to estimate answers to more complex, multi-step calculations by rounding numbers within a question to one significant figure including where there is a decimal in the denominator. **Opportunity for challenge:** • Students will know how to estimate roots.	**Estimate –** an approximate calculation of the value of something	• Students need to know how to round to 1 significant figure. • Students need to know how to divide by a decimal.	**Steps to Success - Estimation** **Step 1:** Round the values in the question to **1 significant figure.** **Step 2:** Use BIDMAS to calculate the answer making sure to show each step.	
To learn how to find error intervals.	• Students will know how to find the upper and lowers bounds of numbers given to varying degrees of accuracy. • Students will know how to use inequality notation to specify error intervals due to rounding. • Students will know how to use inequality notation to specify error intervals due to truncation.	**Upper bound** – an element greater than or equal to all the elements in a given set **Lower bound** – an element less than or equal to all the elements in a given set **Error interval** – an expression written using inequalities that shows the range of possible values that a number could have been before it was rounded or truncated. **Inequality –** a symbol which makes a non-equal comparison between two numbers or other mathematical expressions e.g. >, <, ≥ and ≤ **Truncated –** cut off **Split the vocabulary up between sections of the lesson.**	• Students need to know how to round to different degrees of accuracy.	**Steps to Success – Finding Upper and Lower Bounds** **Step 1:** List the values with the same degree of accuracy that would come before and after the number that has been rounded with the number in the question in the middle. **Step 2:** Find the midpoint of the lowest value and the value that has been rounded – this is the lower bound. **Step 3:** Find the midpoint of the highest value and the value that has been rounded – this is the upper bound.	

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To learn how to find the HCF and LCM from lists.	• 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 how to find the highest common factor (HCF) of two numbers using listing. • Students will know how to find the lowest common multiple (LCM) of two numbers using listing. **Opportunity for challenge:** • Students will know how to solve worded problems involving the LCM.	**Multiple –** A multiple is a number in the given number's multiplication tables **Factor –** A factor is a number that divides into a given number without leaving a remainder **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 **Split the vocabulary up between sections of the lesson.**	• Students need to know how to identify factors, multiples and prime numbers from a list.	**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.	
To learn how to find the HCF and LCM using a Venn diagram.	• Students will know how to find the product of prime factors and write the solution in index form. • Students will know how to find the highest common factor (HCF) of two numbers using a Venn diagram. • Students will know how to find the lowest common multiple (LCM) of two numbers using a Venn diagram.	**Prime Number** – a number that has exactly 2 factors - 1 and the number itself. **Product** – the result of multiplication **Product of Primes** – a product in which every factor is a prime number **Intersection** – the overlap of a Venn diagram **Split the vocabulary up between sections of the lesson.**	• Students need to know how to write a number as a product of its prime factors.	**Steps for Success – Product of prime factors** **Step 1:** To construct a factor tree, think of 2 numbers which multiply together to make the integer in the question. **Step 2:** Draw two branches coming down from the integer, and at the end of the branches write the two factors that you chose. **Step 3:** If a factor is prime, then circle it. If a factor is not prime, then repeat the process until each number at the end of each branch is prime. **Step 4:** Write the prime factors as a product in index form. **Steps for Success – Finding the HCF and LCM from Venn diagrams.** **Step 1:** Find the product of prime factors for both numbers. **Step 2:** Now draw a Venn diagram where each circle represents each number. **Step 3:** Cross off a common factor from both lists and place the number in the overlap/intersection of the Venn diagram. Repeat this until there are no common factor left. **Step 4:** Place any remaining numbers from the lists into the circle that represents that number. **Step 5:** To find the **HCF**, we multiply the numbers in the intersection (these are the factors that are common between both numbers). To find the **LCM** we multiply all of the numbers in the Venn diagram together.	
To learn how to convert between standard form and ordinary numbers.	• Students will know that a number written in standard form is written as a x 10^n where $1 \leq a < 10$ • Students will know how to write large and small numbers in standard form in the form a x 10^n where $1 \leq a < 10$ • Students will know how to convert numbers from standard form back into ordinary numbers. • Students will know when a number is/isn't written in standard form because either $a > 10$ or $a < 0$ **Opportunity for challenge:**	**Standard form -** a way of writing down very large or very small numbers easily, a number is written in standard form when it is written in the form a x 10^n where $1 \leq a < 10$	• Students need to know how to multiply and divide by powers of 10.	**Steps to Success - Writing numbers in standard form** **Step 1:** To write a number in standard form put the decimal point after the first significant figure. This will give you 'a' between 1 and 10. **Step 2:** Work out how many times you would have to multiply or divide that number by 10 to get the original number. **Step 3:** Write this after your number as x10^n where n is positive if the number needs multiplying by 10 and negative if we need to divide the number by 10. The value of n tells us how many times we need to multiply or divide by 10.	

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	• Students will know how to adjust a number written in the form a x 10^n where a > 10 or a ≤ 0 so that it is written in standard form (in the form a x 10^n where 1 ≤ a < 10) • Students will know how to compare numbers written in standard form and how the x10^n affects the size of one number compared with another.			<u>Steps to Success - Converting numbers out of standard form</u> To convert a number that is written in the form $a \times 10^n$ out of standard form, when n is positive multiply the 'a' by 10, *n* times. When *n* is negative divide the 'a' by 10, *n* times.	
To learn how to add and subtract numbers written in standard form.	• Students will know that to add and subtract numbers written in standard form. **Opportunity for challenge:** • Students will know how to solve more complex problems with numbers written in standard form both with and without a calculator (as appropriate).		• Students need to know how to convert from standard form to ordinary numbers and vice versa.	<u>Steps to Success - Adding and subtracting numbers in standard form</u> **Step 1:** Write the numbers as ordinary numbers by multiplying or dividing by powers of 10. **Step 2:** Add or subtract the numbers using the column method. **Step 3:** Convert your answer into standard form, if necessary.	
To learn how to multiply and divide numbers written in standard form.	• Students will know how to multiply numbers in standard form. • Students will know how to divide numbers in standard form. **Opportunity for challenge:** • Students will know how to solve more complex problems with numbers written in standard form both with and without a calculator (as appropriate).		• Students need to know the index laws for multiplication and division.	<u>Steps to Success – Multiplying numbers in standard form</u> **Step 1:** Multiply the 'a' for each number written in standard form. **Step 2:** Multiply the two 10^n parts. Remember that we will need to add the powers. **Step 3:** Put the two parts back together. **Step 4:** If necessary, check your answer is written in standard form, if not you will need to adjust your answer. <u>Steps to Success – Dividing numbers in standard form</u> **Step 1:** Divide the 'a' for each number written in standard form. **Step 2:** Divide the two 10^n parts. Remember that we will need to subtract the powers. **Step 3:** Put the two parts back together. **Step 4:** If necessary, check your answer is written in standard form, if not you will need to adjust your answer.	
To learn how to use a calculator.	• Students will know how to use a calculator to carry out complex calculations and round answers as appropriate when necessary. • Students will know how to use a calculator to carry calculations involving fractions, standard form, powers and roots.		• Students need to know how to round to decimal places and significant figures.		
Exam Preparation 2					