The Sutton Academy

Knowledge Rich Curriculum Plan

Year 9 Prime – Fractions and Percentages

Lesson objective	Intended Knowledge:	Tiered Vocabulary	Prior Knowledge:	Steps to Success	Feedback
To learn how to add and subtract fractions.	• Students will know how to add fractions with different denominators. • Students will know how to subtract fractions with different denominators. • Students will know how to add mixed numbers. • Students will know how to subtract mixed numbers. • Students will know to write their answers in the simplest form when possible. • Students will know solve real-life problems involving adding and subtracting fractions. • Students will know how to solve multi-step/complex problems involving adding and subtracting fractions.	**Improper Fraction –** a fraction where the numerator is larger than the denominator **Mixed Number –** a number consisting of an integer and a proper fraction. **Fraction –** a way of representing the parts of a whole or collection of objects. Fractions have a numerator and denominator. **Denominator –** the bottom number in a fraction **Numerator –** the top number in a fraction **Simplify –** make something simpler or easier to manage	• Students need to know how to simplify fractions. • Students need to know how to convert between improper fractions and mixed numbers. • Students need to know how to find the HCF of two numbers.	**Steps to Success – Adding and subtracting fractions** **Step 1:** In order to add and subtract fractions, you need both fractions to have a common denominator. There are two main methods for choosing a common denominator: • Use the lowest common multiple (LCM) of the two denominators. • Use the product of the two denominators. **Step 2:** Once you have chosen your common denominator you have to ensure you keep the fractions equivalent to the original fractions in the question. This means that whatever you have done to the denominator of the original fraction, you must also do to the numerator. **Step 3:** You can now just need to add or subtract the two numerators. The denominator stays the same. **Step 4:** Check whether your answer can be simplified and/or converted into a mixed number.	
To learn how to multiply and divide fractions.	• Students will know how to multiply fractions by multiplying the numerators and multiplying the denominators. • Students will know how to multiply integers by fractions. • Students will know how to multiply mixed numbers. • Students will know how to divide fractions by multiplying the first fraction with the reciprocal of the second fraction. • Students will know how to divide integers by fractions. • Students will know how to divide fractions by integers. • Students will know how to divide mixed numbers. • Students will know how to write their answers in the simplest form when possible. • Students will know solve real-life problems involving multiplying and dividing fractions.		• Students need to know how to simplify fractions. • Students need to know how to convert between improper fractions and mixed numbers.	**Steps to Success - Multiplying fractions** **Step 1:** Convert any mixed numbers into improper fractions and/or write any integers as a fraction over 1. **Step 2:** Multiply the numerators. **Step 3:** Multiply the denominators. **Step 4:** Check whether your answer can be simplified and/or converted into a mixed number. **Steps to Success - Dividing fractions** **Step 1:** Convert any mixed numbers into improper fractions and/or write any integers as a fraction over 1 **Step 2:** Keep the first fraction the same, change the divide into a multiply and find the reciprocal of the second fraction. **Step 3:** Multiply the numerators. **Step 4:** Multiply the denominators. **Step 5:** Check whether your answer can be simplified and/or converted into a mixed number.	
To learn how to find the fraction of a quantity and calculate with fractions on a calculator.	• Students will know that to find the fraction of a quantity by dividing the quantity by the denominator and then multiplying the result by the numerator. • Students will know how to find the fraction of a quantity using simple fractions with numerators of 1. eg. $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{5}$ • Students will know how to find the fraction of a quantity using fractions with numerators of more than 1. eg. $\frac{2}{3}$, $\frac{3}{4}$, $\frac{7}{10}$	**Quantity** - the amount or number of a material or abstract thing	• Students need to know how to multiply and divide integers. • Students need to know how to input fractions into a calculator.	**Steps to Success – Fractions of an Amount** **Step 1:** Divide the quantity in the question by the denominator. **Step 2:** Now multiply the answer by the numerator.	

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	• Students will know how to compare fractions of different quantities. • Students will know how to solve real-life problems using fractions of quantities. • Students will know how to use a calculator to simplify fractions. • Students will know that a calculator will always give a fractional answer in its simplest form. • Students will know how to convert improper fractions to mixed numbers using a calculator. • Students will know how to convert mixed numbers to improper fractions using a calculator. • Students will know how to use a calculator to add, subtract, multiply and divide fractions. • Students will know how to use a calculator to find a fraction of a quantity. • Students will know how to complete calculations with mixed numbers on a calculator.				
To learn how to convert between fractions, decimals and percentages.	• Students will know how to convert fractions to percentage and decimals with fractions such as $\frac{6}{25}$, $\frac{7}{10}$ and $\frac{3}{8}$. • Students will know how to convert decimals to percentages and fractions using decimals such as 0.45, 0.013 and 1.5. • Students will know how to convert decimals to fractions and percentages with percentages such as 34%, 127% and 42.3%. • Students will know how to convert between fractions, decimals and percentages with a calculator. • Students will know how to order a mixture fractions, decimals and percentages with and without a calculator. • Students will know how to solve real-life problems involving converting fractions, decimals and percentages.	**Convert –** change a value or expression from one form to another **Percentage** – a rate, number, or amount in each hundred. **Fraction –** a way of representing the parts of a whole or collection of objects. Fractions have a numerator and denominator. **Decimal –** a number whose whole number part and the fractional part is separated by a decimal point	• Students need to know how to multiply and divide by powers of 10. • Students need to know how to find equivalent fractions. • Students need to know basic fraction, decimal and percentage conversions such as $\frac{1}{2}$, $\frac{1}{4}$ and $\frac{3}{4}$.	**Steps to Success – Converting decimals to fractions** **Step 1:** Multiply the decimal by powers of 10 to gain an integer value. **Step 2:** Place the power of 10 used as the denominator. **Steps to Success – Converting decimals to percentages** **Step 1:** All percentage are out of 100. So, multiply the decimal by 100 to turn it into a percentage. **Steps to Success – Converting percentages to decimals** **Step 1:** All percentages are out of 100. So, divide the percentage by 100 to turn it into a decimal. **Steps to Success – Converting percentages to fractions** **Step 1:** All percentage are out of a hundred. So, rewrite the percentage as a fraction. **Step 2:** You may need to multiply the numerator and denominator by powers of 10 to ensure the numerator is an integer. **Step 3:** Check to see if the question asks for the fraction in its simplest form. If so, simplify the fraction. **Steps to Success – Converting fractions to decimals** **Step 1:** When possible find an equivalent fraction with a denominator of 100 or 10. If this is not possible then go straight to step 2. **Step 2:** Divide the numerator by the denominator using short division if necessary. **Steps to Success – Converting fractions to percentages** **Step 1:** When possible find an equivalent fraction with a denominator of 100 – you can then write your percentage straight away as all percentages are out of 100. If this is not possible then go straight to step 2.	

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				Step 2: Divide the numerator by the denominator using short division if necessary. This will give you a decimal. **Step 3:** Convert the decimal into a percentage by multiplying it by 100.	
To learn how to convert between recurring decimals and fractions.	• Students will know that recurring decimals are irrational decimal numbers that repeat periodically. • Students will know how to convert fractions to recurring decimals using division. • Students will know how to convert recurring decimals to fractions using the algebraic method.	**Recurring** - occurring again periodically or repeatedly	• Students need to know how to convert between fractions and decimals. • Students need to know how to simplify fractions.	**Steps to Success - How do we convert recurring decimals to fractions?** **Step 1:** Let x equal the recurring decimal written out to several decimal places **Step 2:** Multiply x by the appropriate power of ten – (if only one digit recurs then multiply by 10, if two digits recur then multiply by 100, if three digits recur then multiply by 1000 and so on) **Step 3:** Rewrite this as 10x/100x/1000x = the recurring decimal multiplied by that power of 10 **Step 4:** Set up column subtraction **Step 5:** Subtract x from 10x/100x/1000x **Step 6:** Divide by the coefficient of x to find the fraction equivalent for the recurring decimal	
To learn how to increase or decrease an amount using percentages.	• Students will know how to calculate any percentage of an amount. • Students will know how to find the percentage of an amount using real-life problems. • Students will know that increasing an amount by a percentage will cause the amount to get bigger. • Students will know that decreasing an amount by a percentage will cause the amount to get smaller. • Students will know how to increase or decrease an amount using percentages in real-life problems. • Students will know how to calculate VAT. • Students will know how to find percentages of amounts using a calculator. • Students will know how to increase percentage increase of decrease using a calculator.	**Increase –** a rise in the size, amount, or degree of something **Decrease –** a drop in the size, amount, or degree of something **VAT – Value Added Tax** – a tax that is applied to the purchase price of certain goods, services and other taxable supplies that are bought and sold within the UK. Standard VAT is 20%.	• Students need to know how to find 50%, 25%, 10%, 5% and 1% of a given amount.	**Steps to Success - Increase and decrease amounts using percentages.** **Step 1:** Find the percentage of the amount of the value in the question. **Step 2:** When a question asks you to increase an amount by a given percentage, you add the percentage of the amount found onto the original value in the question. When a question asks you to decrease an amount by a given percentage, you subtract the percentage of the amount found from the original value in the question. **Step 3:** Check that your answer makes sense. When increasing, the answers should be larger than the original value in the question. When decreasing, the answer should be smaller than the original value in the question.	
To learn how to calculate percentage change.	• Students will know how to calculate the value of a profit or loss and use it to determine percentage profit or loss. • Students will know that $percentage\ profit = \frac{profit}{expense} \times 100$	**Profit –** a financial gain, the difference between the amount earned and the amount spent in buying, operating, or producing something **Expense –** the cost incurred in or required for something.	• Students need to know how to express a number as a percentage of another.	**Steps to Success- Percentage Change** Both profit and loss can follow the same formula: **Step 1:** Identify the change by subtracting the smaller amount from the greater amount. **Step 2:** Identify the original cost or expense. **Step 3:** Substitute into the following formula:	

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	• Students will know that $percentage\ loss = \frac{loss}{expense} \times 100$ • Students will know how to calculate percentage change with and without a calculator. • Students will know how to solve real-life problems involving percentage change.			$Percentage\ change = \frac{change}{original\ cost\ or\ expense} \times 100$	
To learn how to use reverse percentages	• Students will know how to find the original amount given the final amount after a percentage increase or decrease (reverse percentages). • Students will know how to find the original amount using reverse percentages with and without a calculator. • Students will know how to recognise when they need to use reverse percentages. • Students will know how to find the original amount given the value of the percentage change. • Students will know how to solve real-life problems using reverse percentages. **Opportunity for challenge:** • Students will know how to solve multi-step reverse percentage problems.		• Students need to know how to multiply and divide integers.	**Steps to Success - Reverse percentages** **Step 1:** There are 3 types of reverse percentage questions. Firstly, identify whether is an increased percentage, a decreased percentage or the same percentage. **Step 2:** • If the original amount has been reduced by a percentage subtract the percentage from 100%. • If the original amount has been increased by a percentage add the percentage to 100%. • If the original amount is equal to the percentage change then go to step 3. **Step 3:** Write this percentage equal to the new amount given in the question. **Step 4:** Divide to find 1%. **Step 5:** Multiply the answer by 100 to find 100%. **Step 6:** Check that the answer looks right. You can also check by calculating the increase/decrease with your answer.	
To learn how to calculate simple and compound interest.	• Students will know the difference between simple and compound interest. • Students will know how to calculate simple interest with and without a calculator. • Students will know how to solve problems involving simple interest. • Students will know how to calculate the compound interest of an amount. • Students will know how to calculate the compound depreciation of an amount. • Students will know how to calculate compound interest or depreciation of an amount using a calculator. **Opportunity for challenge:** • Students will know how to solve a problem involving compound interest or depreciation.	Cultural Capital -Simple Interest Vs Compound Interest Interest - a fee paid for borrowing money or other assets or an amount earned by saving money in a bank account that pays it	• Students need to know how to increase and decrease amounts using percentages. • Students need to know how to use a calculator to find percentages.	**Steps to success- Simple Interest** **Step 1:** Begin calculating the percentage of the original amount. **Step 2:** Multiply this amount by the number of years the interest has been applied for. **Step 3:** Check what the question wants: • If you need to find only how much interest was gained, you have your answer. If you need to find the total after the interest is applied, add the amount gained from simple interest to the original amount.	

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To learn how to solve problems involving compound interest and depreciation.	• Students will know how to find the compound interest when the interest changes between different years. • Students will know how to solve a problem involving a mixture of compound interest and depreciation. • Students will know how to compare the outcome of using simple interest and compound interest. • Students will know how to solve a problem involving compound interest or depreciation.	**Compound Interest –** the interest on a loan or deposit that accrues on both the initial principal and the accumulated interest from previous periods. **Depreciation –** a decrease in the value **Accumulated –** built up over time **Accrued –** received **Initial –** starting/original amount **Annum –** year	• Students need to know how to find simple interest. • Students need to know how to find compound interest and depreciation.	**Steps to Success – Compound interest** **Step 1:** Add the percentage to 100% and divide by 100 to find the multiplier. **Step 2:** Calculate the compound interest by filling in the calculation: $Original\ amount \times multiplier^n$ Where n is the number of years the money is invested for **Steps to Success – Compound depreciation** **Step 1:** Subtract the percentage from 100% to find the percentage multiplier. **Step 2:** Calculate the compound interest by filling in the calculation: $Original\ amount \times multiplier^n$ Where n is the period of time.	
To consolidate understanding of fractions and percentages.	• Students will know how to calculate with fractions using the 4 operations. • Students will know how to calculate percentages with and without a calculator. • Students will know how to calculate percentage increase/decrease without a calculator. • Students will know how to calculate percentage change. • Students will know how to calculate reverse percentages. • Students will know how to calculate simple/compound interest and depreciation.		• Students need to know how to calculate multipliers.		
Mini-Assessment 2					