

Unit Overview: Reasoning with number								
Half-Term:	AUT 1	AUT 2	SPR 1	SPR 2	SUM 1	SUM 2	No of Lessons:	24
<b>Key Focus for Unit:</b>								
<i>What is the key knowledge being delivered? What is the intent of this unit?</i>								
<b>Weeks 1 and 2: Numbers</b>								
Students will develop their knowledge of the number system to include rational and real numbers, with the higher strand also looking at simple surds. The block provides plenty of opportunity for students to revisit and practise their number skills both with and without a calculator as necessary. Standard form and HCF/CM are also revisited.								
<b>Weeks 3 and 4: Using Percentages</b>								
Building on their revision of fractions in the last block, students relate these to fractions and decimals, extending their learning in Year 8. All students will look at 'reverse' percentage problems with higher attainers stretched by looking at repeated percentage change. Both calculator and non-calculator methods are encouraged, with the use of decimal multipliers again key.								
<b>Weeks 5 and 6: Maths and Money</b>								
Students practise their number skills in various financial contexts in this block. The language of financial mathematics, already introduced in Years 7 and 8 is further developed. Simple ideas of tax and wages are introduced, and the percentages studied in the last block are applied in various contexts including simple and compound interest.								
<b>Key:</b>								
<b>MASTERY</b> – The skills and knowledge we want all our students to master and recall quickly.								
<b>SECURE</b> – The skills and knowledge that we will need to return to regularly and interleave in order for our middle and lower attaining students to secure mastery or for which they might struggle.								
<b>DEVELOPING</b> – The skills and knowledge that we will use to stretch and challenge our most abled students.								
<b>Number</b> <ul style="list-style-type: none"> <li>Investigate different types of number</li> <li>Round to 1 significant figure to estimate answers to calculations</li> <li>How to solve problems involving directed numbers</li> <li>How to use Venn diagrams to use the LCM and HCF of two numbers</li> <li>How to solve problems in a variety of contexts</li> <li>How to solve problems involving fractions</li> <li>How to write numbers in standard form</li> <li>result of a percentage change</li> <li>How to apply repeated percentage change</li> </ul>			<b>Using Percentages</b> <ul style="list-style-type: none"> <li>How to convert between fractions, percentages and decimals</li> <li>How to increase and decrease by a given percentage</li> <li>How to work out a percentage change</li> <li>How to find the original number given the result of a percentage change</li> </ul>			<b>Maths &amp; Money</b> <ul style="list-style-type: none"> <li>How to analyse bank statements and utility bills?</li> <li>How to calculate simple interest</li> <li>How to calculate Value Added Tax (VAT)?</li> <li>How to calculate compound interest</li> <li>How to solve problems involving wages and salaries</li> <li>How to solve problems with exchange rates and foreign currency</li> <li>How to identify best value for money</li> </ul>		

<p><b>Scaffolded Guidance:</b></p> <ul style="list-style-type: none"> <li>• Emphasise that integers can be negative or positive and that 0 is an integer.</li> <li>• Link rational numbers to fractions</li> <li>• Revise place value and show that terminating decimals are rational.</li> <li>• Use number lines both horizontal and vertical to illustrate the relative position of negative and positive numbers.</li> <li>• Remind students of the use of zero pairs.</li> </ul> <p><b>Stretch Guidance:</b></p> <ul style="list-style-type: none"> <li>• Ask students to simplify surds</li> <li>• Ask students to find the LCM and HCF of algebraic terms eg 2a and 4a</li> </ul>	<p><b>Scaffolded Guidance:</b></p> <ul style="list-style-type: none"> <li>• Emphasise the links between fractions and division.</li> <li>• Use bar models to illustrate building up to non-unit fractions.</li> <li>• Emphasise the links between hundredths and percentages.</li> <li>• Use place value chart to support diving by 100 to find multipliers</li> <li>• Use bar models to represent situations</li> <li>• Explicitly model step-by-step solutions to a problem</li> </ul> <p><b>Stretch Guidance:</b></p> <ul style="list-style-type: none"> <li>• links calculations with percentages to previously learned content on volume of cuboids and factors.</li> </ul>	<p><b>Scaffolded Guidance:</b></p> <ul style="list-style-type: none"> <li>• Start with simplified examples with less information given and fewer values to find to start with.</li> <li>• Discuss unfamiliar vocabulary eg credit/debit/balance.</li> <li>• Start with simple percentages.</li> <li>• Use of calculator to reduce cognitive load</li> <li>• Start with simple exchange rates</li> </ul> <p><b>Stretch Guidance:</b></p> <ul style="list-style-type: none"> <li>• Use Annual Equivalent Rate (AER) calculations to compare the difference between nominal and actual savings rates.</li> <li>• To deepen students understanding you could challenge them to explain the formula for calculating AER and ask them to investigate the impact of changing <math>i</math> and <math>n</math>.</li> </ul>
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**Key Knowledge and Big Ideas:**

*What **Powerful Knowledge** and **Big Ideas** are explored in this Unit?*

*How have these progressed from previous learning? What **gaps in knowledge** have you identified from **baselining** and how are the being closed?*

**BIG IDEAS:**

Number

**Powerful Knowledge:**

- Identifying integers and rational numbers
- Calculating with directed numbers
- Calculating with decimals and fractions
- Working with numbers in standard form
- Finding the LCM and HCF of two or more numbers
- Convert between fractions decimal and percentages
- Working out percentages of amount
- Working out percentages increase and decrease
- Working out the original amount given the result of a percentage change
- Carrying out calculations with money
- Calculating interest as a percentage of an amount
- Finding the cost after VAT has been added.
- Working out the cost of one unit of an item

**Previous Learning:**

- Properties of a number
- Rounding to significant figures
- Factors and Multiples
- Convert between fractions decimals and percentages
- Express ratio in the form 1:n

**Gaps in Knowledge and Misconceptions:**

- Students think that rounding to decimal places and significant figures are the same if the number is a decimal.
- Students think that percentage cannot be greater than 100.
- Students think that any number multiplied by a power of 10 is written in standard form.

<b>Unit Assessment:</b> <i>How will this unit be assessed?</i> <i>What is the frequency of assessments – baselines etc?</i>		
<p>How will this unit be assessed?</p> <ul style="list-style-type: none"> <li>• Baseline Testing with EOB A or similar at start</li> <li>• End of Block Assessment with EOB B at end</li> </ul>	<p><b>Main Topics Covered in assessments</b></p> <ul style="list-style-type: none"> <li>• Adding and subtracting fractions</li> <li>• Four operations with standard form</li> <li>• Prime factor decomposition</li> <li>• LCM and HCF</li> <li>• Simplifying surds</li> <li>• Percentage increase and decrease</li> <li>• Reverse percentage</li> <li>• Compound interest and depreciation</li> <li>• Reading bank statement</li> <li>• Solve problems with exchange rates</li> <li>• Solve unit pricing problems</li> <li>• Solve problems with VAT</li> <li>• Calculate wages and taxes</li> </ul>	
<p><b>Retrieval Practice:</b></p> <ul style="list-style-type: none"> <li>• T/F Retrieval starter</li> <li>• Homework tasks</li> <li>• Formula Quiz</li> <li>• Timetable Quiz</li> </ul>	<p><b>Key Retrieval Topics (Interleaving):</b></p> <ul style="list-style-type: none"> <li>• Rounding numbers to 1 significant figure</li> <li>• Simplifying fractions</li> <li>• Fraction of an amount</li> <li>• Percentages of an amount</li> <li>• Writing numbers in standard form</li> <li>• Reading tables and graphs</li> <li>• Writing ratio in the form 1:n</li> </ul>	
<b>Key Skills Explored</b>	<b>Vocabulary Selected for DVI</b>	<b>Links to Previous Unit</b>
<ul style="list-style-type: none"> <li>• Adding and subtracting fractions</li> <li>• Four operations with standard form</li> <li>• Prime factor decomposition</li> <li>• LCM and HCF</li> <li>• Simplifying surds</li> <li>• Percentage increase and decrease</li> <li>• Reverse percentage</li> <li>• Compound interest and depreciation</li> <li>• Reading bank statement</li> <li>• Solve problems with exchange rates</li> <li>• Solve unit pricing problems</li> <li>• Solve problems with VAT</li> <li>• Calculate wages and taxes</li> </ul>	<ul style="list-style-type: none"> <li>• Root</li> <li>• Rational/irrational</li> <li>• Integer</li> <li>• Surd</li> <li>• Cube root</li> <li>• Square root</li> <li>• Quotient/Product</li> <li>• Difference</li> <li>• Standard form</li> <li>• Multiplier</li> <li>• Profit loss</li> <li>• Depreciate</li> <li>• Debit</li> <li>• Credit</li> <li>• Principal</li> <li>• Annual</li> <li>• Compound</li> <li>• Interest</li> <li>• Per annum</li> <li>• Value added</li> <li>• Wage</li> <li>• income</li> </ul>	<ul style="list-style-type: none"> <li>• Rounding numbers to 1 significant figure</li> <li>• Simplifying fractions</li> <li>• Fraction of an amount</li> <li>• Percentages of an amount</li> <li>• Writing numbers in standard form</li> <li>• Reading tables and graphs</li> <li>• Writing ratio in the form 1:n</li> </ul>

Year 9 Spring 1

<u>Links to Careers/Employability</u>	<u>How does this unit prepare students for the next unit?</u>
<ul style="list-style-type: none"><li>• Bank Statement</li><li>• Bills</li><li>• Meter reading</li><li>• Mortgages</li><li>• Understanding Money</li><li>• Perimeter in everyday life</li></ul>	<ul style="list-style-type: none"><li>• Angles and algebra</li><li>• Best Buy</li><li>• Ratio revisited</li><li>• Direct Proportion</li></ul>