

Unit Overview: Proportions and Proportional Change								
Half- Term:	AUT 1	AUT 2	SPR 1	SPR 2	SUM 1	SUM 2	No of Lessons:	24
<b>Key Focus for Unit:</b>								
<b>Weeks 1 – 2</b>								
<p>This block builds on KS3 work on ratio and fractions, highlighting similarities and differences and links to other areas of mathematics including both algebra and geometry. The focus is on reasoning and understanding notation to support the solution of increasingly complex problems that include information presented in a variety of forms. The bar model is a key tool used to support representing and solving these problems.</p>								
<b>Weeks 3 - 4</b>								
<p>Although percentages are not specifically mentioned in the KS4 national curriculum, they feature heavily in GCSE papers and this block builds on the understanding gained in KS3. Calculator methods are encouraged throughout and are essential for repeated percentage change/growth and decay problems. Use of financial contexts is central to this block, helping students to maintain familiarity with the vocabulary they are likely to use outside school.</p>								
<b>Weeks 5 – 6</b>								
<p>This block also builds on KS3 and provides a good context in which to revisit fraction arithmetic and conversion between fractions, decimals and percentages. Tables and Venn diagrams are revisited and understanding and use of tree diagrams is developed at both tiers, with conditional probability being a key focus for Higher tier students.</p>								
<b>Key:</b>								
<p><b>MASTERY</b> – The skills and knowledge we want all our students to master and recall quickly.</p> <p><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.</p> <p><b>DEVELOPING</b> – The skills and knowledge that we will use to stretch and challenge our most abled students.</p>								
<b>Ratios and Fractions:</b>			<b>Percentages &amp; Interest:</b>			<b>Probability:</b>		
<ul style="list-style-type: none"> <li>Compare quantities using a ratio (R)</li> <li>Link ratios and fractions (R)</li> <li>Share in a ratio (given total or one part) (R)</li> <li>Use ratios and fractions to make comparisons</li> <li>Link ratios and graphs (R)</li> <li>Solve problems with currency conversion</li> <li>Link ratios and scales (R)</li> <li>Use and interpret ratios of the form <math>1 : n</math> and <math>n : 1</math></li> <li>Solve 'best buy' problems</li> <li>Combine a set of ratios</li> <li>Link ratio and algebra</li> <li>Ratio in area problems (H)</li> </ul>			<ul style="list-style-type: none"> <li>Convert and compare fractions, decimals and percentages (R)</li> <li>Work out percentages of amounts (with and without a calculator) (R)</li> <li>Increase and decrease by a given percentage (R)</li> <li>Express one number as a percentage of another (R)</li> <li>Calculate simple and compound interest</li> <li>Repeated percentage change</li> <li>Find the original value after a percentage change</li> <li>Solve problems involving growth and decay (R)</li> </ul>			<ul style="list-style-type: none"> <li>Know how to add, subtract and multiply fractions (R)</li> <li>Find probabilities using equally likely outcomes (R)</li> <li>Use the property that probabilities sum to 1 (R)</li> <li>Using experimental data to estimate probabilities</li> <li>Find probabilities from tables, Venn diagrams and frequency trees</li> <li>Construct and interpret sample spaces for more than one event (R)</li> <li>Calculate probability with independent events</li> </ul>		

<ul style="list-style-type: none"> <li>• Ratio in volume problems (H)</li> <li>• Mixed ratio problems</li> </ul>	<ul style="list-style-type: none"> <li>• Understand iterative processes (H)</li> <li>• Solve problems involving percentages, ratios and fractions</li> </ul>	<ul style="list-style-type: none"> <li>• Use tree diagrams for independent events</li> <li>• Use tree diagrams for dependent events</li> <li>• Construct and interpret conditional probabilities (Tree diagrams) (H)</li> <li>• Construct and interpret conditional probabilities (Venn diagrams and two-way tables) (H)</li> </ul>
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<p><b>Scaffolded Guidance:</b></p> <ul style="list-style-type: none"> <li>• Start with simple ratios and explain the meaning using models</li> </ul> <p><b>Stretch Guidance:</b></p> <ul style="list-style-type: none"> <li>• Explore three part ratios with algebra</li> <li>• Explore ration in a variety of mathematical contexts</li> </ul>	<p><b>Scaffolded Guidance:</b></p> <ul style="list-style-type: none"> <li>• Ensure that students can fluently convert between FDP</li> </ul> <p><b>Stretch Guidance:</b></p> <ul style="list-style-type: none"> <li>• Work backwards with compound interest and decay</li> <li>• Explore compound interest and depreciation in a variety of context</li> </ul>	<p><b>Scaffolded Guidance:</b></p> <ul style="list-style-type: none"> <li>• Explicitly teach students how to cancel fraction</li> <li>• Ensure that students can work fluently with the four operations with fractions</li> <li>• For Venn diagrams with examples that students can relate to.</li> </ul> <p><b>Stretch Guidance:</b></p> <ul style="list-style-type: none"> <li>• Work backwards with Tree diagram</li> <li>• Explore Venn Diagrams with algebra</li> <li>• Explore Tree diagrams with algebra</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, Algebra, Ratio Proportion and Rates of Change, Geometry, Probability and Statistics

**Powerful Knowledge:**

- Share a quantity in a given ratio
- Use three pare ratios
- Link ratio to algebra
- Solve best buy problems
- Solve mix ratio problems involving algebra
- Convert fluently between FDP
- Calculate percentage change
- Calculate reverse percentage
- Calculate compound interest and decay
- Perform the four operations with fractions
- Find probabilities from tables, frequency trees and Venn diagrams
- Construct and interpret Tree diagrams including conditional probability

**Previous Learning:**

- Simplify Ratios
- Share in a given ratio
- Ratio to fraction and link to graph
- Ratio and similar shape –length
- Convert between FDP
- Find the percentage of an amount
- Find Percentage change
- Calculate simple probability
- Construct Frequency Tree
- Draw Two way tables
- Find Relative frequency
- Draw Venn diagrams
- Construct Probability tree diagram

**Gaps in Knowledge and Misconceptions:**

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**Unit Assessment:**

*How will this unit be assessed?*

*What is the frequency of assessments – baselines etc?*

How will this unit be assessed?

- Baseline Testing with EOB A or similar at start
- End of Block Assessment with EOB B at end

**Main Topics Covered in assessments**

- Simplifying ratio
- Share in a given ratio
- Application of ratio (angles in triangle)
- Best buy
- Express ratio in the form 1:n
- Link ratio to algebra
- Ratio in volume and area
  
- Comparing FDP using  $<$ ,  $>$  or  $=$
- Find percentage of an amount
- Simple interest
- Compound interest
- Iteration
- Solve problems involving percentages, ratio and fraction
  
- Relative frequency
- Find probability from a sample space
- Find probability from a two-way-table
- Find probability from a Venn diagram
- Probability tree

**Retrieval Practice:**

- T/F Retrieval starter
- Homework tasks
- Formula Quiz
- Timetable Quiz
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**Key Retrieval Topics (Interleaving):**

- Converting fluently between FDP
- Four operations with fractions
- Calculating probability
- Link ratio to a variety of mathematical concepts
- Link percentage to a variety of mathematical concept
- Two-way table and frequency table to simplify worded problems
- Use Venn diagram in a variety of context

<u>Key Skills Explored</u>	<u>Vocabulary Selected for DVI</u>	<u>Links to Previous Unit</u>
<ul style="list-style-type: none"> <li>• Share a quantity in a given ratio</li> <li>• Three-part ratio</li> <li>• Best buy problems</li> <li>• Application of ratio in a variety of context</li> <li>• Ratio with algebra</li> <li>• Length, area and volume ratio</li> <li>• Find percentage of an amount</li> <li>• Simple interest</li> <li>• Compound interest</li> <li>• iteration</li> <li>• Solve problems involving percentages, ratio and fraction</li> <li>• Relative frequency</li> <li>• Find probability from a sample space</li> <li>• Find probability from a two-way-table</li> <li>• Find probability from a Venn diagram</li> <li>• Probability tree</li> </ul>	<ul style="list-style-type: none"> <li>• Ratio, Equivalent</li> <li>• Direct proportion</li> <li>• Gradient, <math>y = mx + c</math></li> <li>• Exchange rate</li> <li>• Enlarge</li> <li>• Length/area/volume scale factor</li> <li>• Similar</li> <li>• Compound interest</li> <li>• Iterate</li> <li>• Equally likely</li> <li>• Complement</li> <li>• Relative frequency</li> <li>• Sample space</li> <li>• Tree diagram</li> <li>• Independent event</li> <li>• Dependent event</li> <li>• Conditional probability</li> <li>• Venn diagram</li> <li>• Universal set</li> </ul>	<ul style="list-style-type: none"> <li>• Ratio and angles</li> <li>• Ratio with algebra</li> <li>• Percentages with algebra</li> <li>• Ratio link to similar shapes</li> <li>• Probability with algebra</li> </ul>
<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>• Design Industry</li> <li>• Science and research (engineer)</li> </ul>	<ul style="list-style-type: none"> <li>• Non calculator methods</li> <li>• Collecting, representing and interpreting Data</li> </ul>	