KESTEVEN AND SLEAFORD HIGH SCHOOL

Mathematics Scheme of Learning

Year 9 – Term 2/Percentages/Probability/Polygons/Compound Measures

Intent – Rationale

With mathematics being taught in a cyclic format, this term provides a balance of recap, preparation for GCSE and an opportunity for application and discussion on a cross curricular level.

Sequencing – what prior learning does this topic build upon?	Sequencing – what subsequent learning does this topic feed into?
• Year 8 term 3 percentage increase/decrease using multipliers • Year 8 Term 5 polygons (HSL angles in polygons) • Year 8 term 6 theoretical probability, expected frequency, AND OR rules (HSL) • Compound measures in Physics	• Year 9 Term 5 reverse percentages using multipliers, compound interest • GCSE conditional probability • GCSE polygon problems • GCSE compound measures and error interval problems e.g. decision making on safety limits.
What are the links with other subjects in the curriculum?	**What are the links to SMSC, British Values and Careers?**
Art • Mathematical ideas of pattern and shape Design and Technology • Percentage calculations Music • Speed and time – beats per minute PE • Speed/distance/time calculations Science • Percentage calculations • Compound Measures -SDT/DMV/PFA	• GB4e - Solving real life problems, a chance to put new skills in to context and reflect on how mathematics is relevant to everyday life • SP3 – Creativity in learning (probability games, polygon investigations)

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What are the opportunities for developing literacy skills and developing learner confidence and enjoyment in reading?	What are the opportunities for developing mathematical skills?
• 'Mad for Math: Maths adventures using fractions, percentages and decimals' – Linda Betola	• Discussion around impact of changing variables in compound measures • Applications to financial mathematics • New notation – sets, Venn diagrams and tree diagrams

Mathematics Scheme of Learning
Year 9 – Term 2

Intent – Concepts

What knowledge will students gain and what skills will they develop as a consequence of this topic?
National Curriculum reference: Work interchangeably with terminating decimals and their corresponding fractions (such as $\frac{7}{2}$ and 3.5 or 0.375 and $\frac{3}{8}$) . Define percentage as 'number of parts per hundred', interpret percentages and percentage changes as a fraction or a decimal, interpret these multiplicatively, express one quantity as a percentage of another, compare two quantities using percentages, and work with percentages greater than 100% Interpret fractions and percentages as operators. Record, describe and analyse the frequency of outcomes of simple probability experiments involving randomness, fairness, equally and unequally likely outcomes, using appropriate language and the 0-1 probability scale. Understand that the probabilities of all possible outcomes sum to 1. Enumerate sets and unions/intersections of sets systematically, using tables, grids and Venn diagrams. Generate theoretical sample spaces for single and combined events with equally likely, mutually exclusive outcomes and use these to calculate theoretical probabilities. Use compound units such as speed, unit pricing and density to solve problems. Understand and use place value for decimals, measures and integers of any size. Order positive and negative integers, decimals and fractions; use the number line as a model for ordering of the real numbers; use the symbols =, ≠, <, >, ≤, ≥. Use the four operations, including formal written methods, applied to integers, decimals, proper and improper fractions, and mixed numbers, all both positive and negative **Know**

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Use written methods to add and subtract fractions and decimals. Find fractions and percentages of a given amount using non-calculator methods. Use multipliers to increase/decrease an amount by a given percentage. Calculate repeat percentage change. Understand experimental vs theoretical probability. Be able to work out the relative frequency and identify bias and most reliable experimental probability. Calculate the expected frequency using theoretical or experimental probability. Draw and use a Venn diagram to calculate probability of combined events. Draw and use a probability tree diagram to calculate the probability of combined (independent) events.

Know and use angle facts in parallel lines and on a straight line. Calculate interior and exterior angles in polygons.
Know and use the formulae for SDT, DMV and PFA.

Apply

Worded problems including bank interest and depreciation in value.
Calculate the number of sides when given an interior/exterior angle of a regular polygon. Solve problems including decision making with shape tessellation.
Solve SDT, DMV, and PFA problems.

Extend

Research percentage interest earnt and gained.
Draw and use a tree diagram for dependent events.
Create a polygon tessellation.
Discussion around impact of increased/decreased area on pressure and force. Discussion on SDT inversely proportional relationship.

What subject specific language will be used and developed in this topic?	What opportunities are available for assessing the progress of students?
• Fraction, decimal, improper fraction, place value, percentage, percent, multiplier, increase, decrease, depreciation, repeated, interest, simple interest, percentage change • Theoretical, experimental, expected frequency, trial, outcome, event, combined events, independent events, dependent events, probability tree diagram, Venn diagram, intersection, union, set	• End of term unit test • Mid Term marking targets

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• Polygon, interior, exterior, regular, irregular, angle, tesselate, angles around a point, parallel, perpendicular, corresponding, alternate, co-interior, supplementary • Compound, measure, density, pressure, force, area, volume, speed, distance, time, units, formula, formulae, minimum, maximum, safely, error interval, significant figures, decimals places, greatest, least, metric, imperial	

Percentages and Fractions	R	A	G
Add and subtract fractions			
Add and subtract decimals			
Find fractions and percentages of amounts			
Find the amount for a given percentage change using multipliers			
Calculate repeat percentage change			

Probability	R	A	G
Understand experimental vs theoretical probability			
Calculate the relative frequency			
Use a Venn diagram to calculate the probability of an outcome			
Draw a probability tree diagram for independent and dependent events			

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Properties of Polygons	R	A	G
Use the sum of angles in a triangle			
Use the sum of angles in a polygon			
Use the sum of angles on a straight line			
Calculate the interior and exterior angles in a polygon			
Apply the properties of squares, rectangles, parallelograms, trapeziums, kites and rhombus			
Solve algebraic problems with interior and exterior angles			

Compound Measures	R	A	G
Know and use the formula for calculating speed, distance and time			
Know and use the formula for calculating density, mass and volume			
Use a conversion graph			
Round to significant figures			
Write the error interval for a rounded value			
Finding the min/max for a calculation			

Intent – Concepts

Lesson title	Learning challenge	Higher level challenge	Suggested activities and resources
Percentages	Add and subtract fractions	Add and subtract algebraic fractions 'Extension 9' Algebra A2.1 'Extension 9' Number N2.2	Y9 Percentages notebook Mathsbox differentiated questions
	Add and subtract decimals. Recap place value of decimals using		Mathsbox differentiated questions

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	inequalities (preparation for error intervals)		
	Find fractions and percentages of amounts, using non-calculator and multiplier methods	Two step problems. Working backwards '60 is ¾ of which number' 'Problem Solved!' Book 3' Chapter 2	'The National Curriculum…and beyond' Fractions, Decimals and Percentages 'Extension 9' Number N3.1
	Calculate repeat percentage change (increase and decrease) e.g. interest and value depreciation	Mathsbox treasure hunt-depreciation	Mathsbox treasure hunt
	Finance maths: Explore interest earnt and interest gained	'Problem Solved!' Book 3' Chapter 1	NatWest Resources – KMB account
Probability	Understand experimental vs theoretical probability. Calculate the relative frequency.	'The National Curriculum…and beyond' pg139	Experimental probability Y9 Probability notebook 'The National Curriculum…and beyond' pg137-138
	Calculate expected frequency using theoretical and experimental probability.	'Problem Solved!' Book 3' Chapter 9	Create own probability games 'Extension 9' Statistics S3.2
	Use a Venn diagram to calculate the probability of an outcome	Mathsbox treasure hunt set 2	Mathsbox treasure hunt set 1
	Draw a probability tree diagram for independent events	Dependent events	'The National Curriculum…and beyond' pg143 Create own probability games 'Extension 9' Statistics S3.1
Polygons	Use the sum of angles in a triangle and other polygons. Use the sum of angles on a straight line.	'The National Curriculum…and beyond' pg191 'Problem Solved!' Book 3' Chapter 6	Y9 Polygons notebook 'The National Curriculum…and beyond' Section 10/11/12 pg182 'Extension 9' Geometry and Measures GM1.1

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	Calculate the interior and exterior angles in a polygon	Algebraic problems Ratio problems (number of interior: number of exterior)	Mathsbox treasure hunt 'Extension 9' Geometry and Measures GM1.1
	Apply the properties of squares, rectangles, parallelograms, trapeziums, kites and rhombus	Algebraic problems	Goal-less problems 'The National Curriculum…and beyond' Section 14 pg192
Compound measures	Know and use the formula for calculating speed, distance and time	Mixed units 'Problem Solved!' Book 3' Chapter 8	Speed word problems 1 Speed word problems 2 Speed word problems 3 Y9 Compound Measures notebook
	Know and use the formula for calculating density, mass and volume	Pressure, force, area formulae. Discussion around objects which increase pressure (e.g. nail, stiletto) and decrease. PP Mixed units	Recap volume of prism Spot the error
	Use a conversion graph		'Extension 9' A4.3 'The National Curriculum…and beyond' pg258-265
	Round to significant figures. Write the error interval for a rounded value	'Extension 9' Number N1.2	Mini whiteboards Mathsbox bingo
	Finding the min/max for a calculation, including compound measure problems.	Mathsbox bingo	Error interval calculations maze