

KESTEVEN AND SLEAFORD HIGH SCHOOL

Mathematics Scheme of Learning Year 8 – Term 3 Angles/Statistical graphs/Percentages

Intent – Rationale

Angle facts is taught in preparation for bearings with a focus on language and real-life contexts being used alongside refinement of students' use of mathematical equipment. Year 8 students progress from calculating statistical averages to using them to make decisions and justify. Percentages of amounts is recapped in their interpreting of statistical graphs and leads in to calculator methods for % change with a focus on real life problems giving purpose.

Sequencing – what prior learning does this topic build upon?	Sequencing – what subsequent learning does this topic feed into?
<ul style="list-style-type: none"> • Y7 Term 4 Angles • Y7 Term 5 FDP • Y7 Term 5 Statistics 	<ul style="list-style-type: none"> • Y8 Term 5 Angles in polygons • Y8 Pythagoras' Theorem • Y9 Term 2 Percentages and fractions • Y9 Term 4 Statistical charts • Y9 Term 5 Percentages and finance • Y9 Term 6 Circle Theorems
What are the links with other subjects in the curriculum?	What are the links to SMSC , British Values and Careers ?
<ul style="list-style-type: none"> • Design and Technology - Percentage calculations • Geography - Map work and bearings, Analysing, collecting, representing, interpreting data • History - Analysing and interpreting data • Languages - Interpret and discuss results • PE - Compass bearings • RE - Analysing, collecting, representing, interpreting data • PSHE - Analysing, collecting, representing, interpreting data • Science - Data handling, Percentage calculations 	<ul style="list-style-type: none"> • GB4efghi • SP2&3, C1 <p>Mutual Respect:</p> <ul style="list-style-type: none"> • Behave appropriately, allowing all participants the opportunity to work effectively • Take turns and share equipment • Review each other's work respectfully • Work collaboratively on problems, help and advise others <p>Democracy:</p> <ul style="list-style-type: none"> • Statistics: seek to understand what data charts seek to communicate, consider ideas around proportion

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	<ul style="list-style-type: none"> Develop understanding of inference, extrapolation and limitations in data <p>Tolerance:</p> <ul style="list-style-type: none"> Highlight the evolution of Maths and its reliance on other cultures to develop, illustrating that Maths is a global language Learn about other faiths in topics such as Islamic art <p>Rule of Law:</p> <ul style="list-style-type: none"> Follow safe practice in the classroom Understand consequence if rules are not followed <p>Individual liberty:</p> <ul style="list-style-type: none"> Work within boundaries to make safe choices Make own choices in data handling activities
What are the opportunities for developing literacy skills and developing learner confidence and enjoyment in reading?	What are the opportunities for developing mathematical skills?
<ul style="list-style-type: none"> Why do Buses Come in Threes? by Rob Eastaway and Jeremy Wyndham 	<ul style="list-style-type: none"> Use of mathematical equipment protractor and compass New language introduced: depreciation, angle of elevation, comparing distributions

Mathematics Scheme of Learning Year 8 – Term 3 Angles/Statistical graphs/Percentages

Intent – Concepts

What knowledge will students gain and what skills will they develop as a consequence of this topic?

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Know

Identify and name all types of angles formed by parallel lines and a transversal.

To calculate angles in parallel lines. To know the geometric properties of quadrilaterals. To find missing angles in all types of triangles, quadrilaterals and parallel line problems using angle properties.

To draw a scatter diagram. To interpret and describe the relationship between two variables and identify correlation. To be able to draw a suitable line of best fit. To construct a pie chart. To be able to interpret a pie chart including calculating frequency of categories or population.

To write one quantity as a percentage of another. To use multipliers to increase and decrease an amount. To work out a change in value as a percentage.

Apply

To be able to estimate from a scatter graph and identify outliers, justifying why they are outliers.

Context problems including simple interest.

Extend

Use angle facts to solve bearing problems

To understanding and explain misleading information in charts. To recognise when extrapolation occurs and its disadvantages. To be able to compare pie charts, recognising proportion and population is different.

Increase amounts by a percentage greater than 100% using a multiplier.

Understand the difference between correlation and causation and that correlation refers to linear relationships; there may be a relationship between variables, but this does not necessarily equate to a correlation.

What subject specific language will be used and developed in this topic?	What opportunities are available for assessing the progress of students?
Tier 2 Degrees Geometry Geometrical Parallel Bearing	Lesson <ul style="list-style-type: none"> Formative assessment occurs throughout lessons and will address common misconceptions as well as help to inform pace and depth of lesson delivery. Formative assessment will be conducted using a

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<p> Total frequency Correlation Causation Strong Weak Percentage Decrease Increase Profit Loss Compare Reverse Compound Off Of Depreciate Appreciate Interest Tax VAT Decay Tier 3 Right angle Acute angle Obtuse angle Reflex angle Pie chart Scatter graph Line of best fit Vertically opposite Alternate angles </p>	<p>variety of methods as prescribed in the Mathematics Teaching and Learning Protocol.</p> <p>Homework</p> <ul style="list-style-type: none"> • Retrieval homework issued termly followed by teacher www/ebi comments with a week built in for pupils to digest and follow up on feedback in preparation for retrieval/termly test. • Y8 Homework booklet which contains problem solving questions (including from Junior Maths Challenge past papers), skills checks and topic related tasks • Mathswatch assignments <p>Marking</p> <ul style="list-style-type: none"> • Retrieval homework issued termly followed by teacher www/ebi comments with a week built in for pupils to digest and follow up on feedback in preparation for retrieval/termly test. • Pupils are to self-mark classwork as directed by the teacher. The use of a green marking triangle is encouraged to allow efficient monitoring of pupil progress during book and pupil folder checks which occur termly for each class. Common errors and misconceptions should be addressed as a class. <p>Assessment</p> <ul style="list-style-type: none"> • Retrieval assessment will occur this term which will identify pupils for 'topic top-up' in preparation for next terms teaching.
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<p>Corresponding angles Multiplier</p> <p>Notation Dash notation to represent equal lengths in shapes and geometric diagrams Arrow notation to show parallel lines Bearings are always given as three figures; e.g. 025°</p>	
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Intent – Concepts

Lesson title	Topic Title	Key Knowledge all students need (plus common misconceptions identified and planned for)	Higher level challenge	Suggested activities and resources
Approx 5 lessons	Angles	<p><u>Key Knowledge</u></p> <p>To calculate angles in parallel lines</p> <p>To know the geometric properties of quadrilaterals</p> <p>To find missing angles in triangles, quadrilaterals and parallel line problems using angle properties</p> <p>To calculate bearings using angle facts</p> <p><u>Common Misconceptions</u></p>	<p>Algebraic problems, including forming and solving problems</p> <p>Multistep problems combining multiple angle facts</p>	<ul style="list-style-type: none"> ▪ Department PowerPoint (to be adapted to reflect class requirements) ▪ Angles and parallel lines worksheet

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		<p>Some pupils may think that alternate and/or corresponding angles have a total of 180° rather than being equal.</p> <p>Measuring bearings anticlockwise rather than clockwise</p> <p>Not measuring bearings from north</p> <p>Incorrect use of formula $(n-2) \times 180$ from sum of interior angles – forgetting to subtract the two</p> <p>Use of non-mathematical language such as ‘Z-angle’ or ‘F-angle’ to justify angle facts</p> <p>Incorrect use of labelling conventions such as arrows on parallel lines, hatch markings, $\angle ABC$ and perpendicular markings</p> <p>If the bearing of A from B is ‘x’, then some pupils may think that the bearing of B from A is ‘$180 - x$’</p>		
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		The north elevation is the view of a shape from the north (the north face of the shape), not the view of the shape while facing north.		
Approx 5 lessons	Statistical Graphs	<p><u>Key Knowledge</u></p> <p>To draw and interpret scatter graphs</p> <p>To draw a line of best fit and interpret data</p> <p>To draw and interpret pie charts</p> <p>To interpret statistical diagrams including misleading charts</p> <p><u>Common Misconceptions</u></p> <p>Being unable to read or choose an appropriate scale</p> <p>Having difficulty viewing the graph dynamically, i.e. thinking about what happens as a variable varies</p> <p>Having difficulty expressing correlations in context,</p>	<p>Statistical charts with algebraic expressions</p> <p>Pie charts which have 'more than' problems</p>	<ul style="list-style-type: none"> ▪ Department PowerPoint (to be adapted to reflect class requirements) ▪ Scatter graph worksheet ▪ Scatter graph matching

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		<p>particularly negative correlations</p> <p>Confusing no correlation and negative correlation</p> <p>Thinking that all lines of best fit must pass through the origin</p> <p>Some pupils may confuse the fact that the sections of the pie chart total 100% and 360°</p>		
Approx 3 lessons	Percentages	<p><u>Key Knowledge</u></p> <p>To write one quantity as a percentage of another</p> <p>To use a multiplier to calculate a percentage change.</p> <p>To work out a change in value as a percentage increase or decrease</p> <p><u>Common Misconceptions</u></p> <p>Not understanding that percent means out of 100</p> <p>Not understanding that fractions, decimals and</p>	Multi- step problems	<ul style="list-style-type: none"> ▪ Department PowerPoint (to be adapted to reflect class requirements) ▪ Expressing an amount as a percentage worksheet ▪ Maze worksheet

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		<p>percentages can all be equivalent</p> <p>Failing to differentiate between 'of' and 'off'</p> <p>Lack of contextual real-life understanding of e.g. 30% off or +VAT</p> <p>Only being able to use one method to calculate percentages, e.g. an additive model</p> <p>Some pupils may think that the multiplier for a 150% increase is 1.5</p> <p>Some pupils may think that increasing an amount by 200% is the same as doubling.</p>		
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