Topic Sequence: Reasoning

1	2	
Multiplicative Reasoning	Geometric Reasoning	Algebraic Reasoning

Topic Overview: Geometric Reasoning

Students consolidate their knowledge of angle facts and develop increasingly complex chains of reasoning to solve geometric problems. Students revisit the key topics of Pythagoras and Trigonometry and vectors.

Content covered includes reasoning deductively in geometry, number and algebra using geometrical constructions, revision of bearings in trigonometric situations, applying addition and subtraction of vectors, multiplication of vectors by a scalar and diagrammatical and column representations of vectors.

Lesson Sequence:

Review of Angle facts
This step provides students with opportunity to revise basic angle facts including angles at appoint, in parallel lines and in polygons. As students have already seen these rules several times, interleaving other topics such as ratio and equations is used to maintain the level of challenge whilst securing knowledge

Proving geometric facts
This small step provides opportunity for students to use all the angle facts to prove simple geometric facts. Students should know that (eg) 'angles in a triangle' is not sufficient, but 'angles in a triangle sum to 180 degrees' is sufficient.

Understand and represent vectors
A vector shows both magnitude and direction and students also recognise the role of the arrow to show direction of the vector, considering the start and end points for magnitude. Students can compare vectors of the same magnitude but different directions. Students are familiar with two representations of vectors: column vector and line segment with an arrow and are introduced to the formal notation for labelling vectors and **a** and $\underline{a}$. Students develop a deeper understanding of a vector representing movement from one point to another and start comparing different representations.

Vectors multiplied by a scalar
Students explore vectors that are parallel to each other, understanding that when vectors are parallel, one is the multiple of the other and the multiplier is called a scalar. Students identify negative multipliers where vectors are parallel but in opposite directions.

Addition and subtraction of vectors
Students become confident in identifying and drawing representations of vector addition and subtraction and looking at resultant vectors.

Vector journeys in shapes
Students move around shapes from one vertex to the next using the notation etc. They explore quadrilaterals through parallel and non-parallel vectors, making generalisations about different vectors. Students appreciate that a vector is only parallel to another if one is a multiple of the other, realising that the multiplier can be negative or fractional.

Sequence of Learning:

1	Review of angle facts
2	Proving geometric facts
3	Understand and represent vectors
4	Vectors multiplied by a scalar
5	Addition and subtraction of vectors
6	Vector journeys in shapes

Topic Resources:

Knowledge Map:	Angles Pythagoras and Trigonometry – right angled triangles Vectors

Assessment:

Knowledge:	End of Topic Test
Application of Knowledge:	Termly Summative Assessments

Supportive Reading:

Any supported reading listed here	Sparx maths: www.sparxmaths.co.uk
	Corbett Maths: www.corbettmaths.com
	AQA Revision guide