

Topic Sequence: Geometry

5	6	7
Angles and Bearings	Working with Circles	Vectors

Topic Overview: Vectors

Students will have met vectors to describe transformations during KS3. This will be revisited and used as the basis for looking more formally at vectors, discovering the meaning of $-\mathbf{a}$ compared to \mathbf{a} to make sense of operations such as addition, subtraction and multiplication of vectors. This will connect to exploring journeys withing shapes using vector notation. Higher tier students will then use this understanding as the basis for developing geometric proof, making links to their knowledge of properties of shape and parallel lines.

Learning Sequence:

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 \mathbf{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 (H):

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.

Explore colinear points using vectors (H):

In this small point, students consider ‘collinear’ and its meaning. Students need to give the complete reason – that lines are parallel and that they share a point to be on the same line

Use vectors to construct geometric arguments and proofs

Students use key command words, ‘show, justify, prove’. Students find vectors for parts of line segments, given the vector for a whole line segment, applying knowledge of ratio and fractions where necessary

Sequence of Learning:		Topic Resources:	
1	<u>Understand and represent vectors</u>	Knowledge Map:	Vectors Transformations
2	<u>Vectors multiplied by a scalar</u>		
3	<u>Addition and subtraction of vectors:</u> :	Assessment:	
4	<u>Vector journeys in shapes (H):</u>	Knowledge:	End of Topic Test
5	<u>Explore colinear points using vectors (H):</u>	Application of Knowledge:	Termly Summative Assessments
		Supportive Reading:	
6	<u>Use vectors to construct geometric arguments and proofs</u>	Any supported reading listed here	Sparx maths: www.sparxmaths.co.uk
			Corbett Maths: www.corbettmaths.com
			AQA Revision guide