



# YEAR 10 Spring TERM 1

'An ambitious curriculum that meets the needs of all'

## Medium Term Planning – Units 6, 7 & 8

Working with circles      Vectors      Ratio and Fractions

### UNIT 6 : Working with circles **H & F (8)**

**Previously met: Y8 Area and circumference of a circle, Y9 volume and surface area of cylinders (H-cones and spheres)**

#### Curriculum Intent

To be able to:

- Identify and apply circle definitions and properties, including: centre, radius, chord, diameter, circumference, tangent, arc, sector and segment.
- Calculate arc lengths, angles and areas of sectors of circles.
- Calculate surface areas and volumes of spheres, pyramids, cones and composite solids.
- Apply and prove the standard circle theorems concerning angles, radii, tangents and chords, and use them to prove related results.

#### Links and interleaving

- Perimeter and area of 2D shapes, including compound shapes.
- Properties of 2D and 3D shapes.
- Surface area of cuboids and cylinders.
- Volume of cuboids, cylinders and other prisms.
- Volume of cones, spheres and compound shapes.
- Surface area of prisms.
- Area and circumference of a circle.

### UNIT 7 : Vectors **H(8) and F(4)**

**Previously met: Y9 Translation**

To be able to:

- Describe translations as 2D vectors.
- Apply addition and subtraction of vectors, multiplication of vectors by a scalar, and diagrammatic and column representations of vectors; **(use vectors to construct geometric arguments and proofs).**

#### Links and interleaving

- Interpret mathematical relationships both algebraically and geometrically.
- Apply angle facts, triangle congruence, similarity and properties of quadrilaterals to derive results about angles and sides, and use known results to obtain simple proofs.

#### Skills/Assessment Objective Links

## UNIT 8: Ratio and Fractions H (8) F (12)

**Previously met: Y8 Ratio, Y9 compound units (SDT, MDV)  
Y10 similarity with area and volume**

To be able to:

- Use ratio notation, including reduction to simplest form.
- Divide a given quantity into two parts in a given *part:part* or *part:whole* ratio; express the division of a quantity into two parts as a ratio.
- Relate the language of ratios and the associated calculations to the arithmetic of fractions and to linear functions.
- Use compound units such as speed, unit pricing and density to solve problems.
- Compare lengths, areas and volumes using ratio notation and/or scale factors; make links to similarity.
- Apply the concepts of congruence and similarity, including the relationships between lengths, **(areas and volumes)** in similar figures.

### Links and interleaving

- Convert metric units.
- Convert area and volume measures.
- Understand and use scale factors.
- Scale diagrams and maps.
- Currency conversions.
- Similar shapes.
- Direct and inverse proportion.
- Pi as a ratio.
- Use the for 1:n.
- Link gradient and ratio.

<b>Spiritual, moral, social, and cultural development</b>	<p><b>SMSC:</b> Making choices, looking for patterns which may reflect the natural world, supporting and collaborating with each other, realisation that mathematics is an international language and making cultural links as we explore the history of mathematics.</p> <p><b>PSHE/British Values:</b> Working collaboratively, being respectful during discussion and valuing contributions made by others</p> <p><b>Skills Builder: Key skills in numeracy used in all topic areas.</b></p>
<b>Numeracy</b>	<b>Focus on key skills.</b>
<b>Literacy</b>	<p><b>Vocabulary Tier 2: Command words displayed in the classroom and italicized/bold font used in shared resources/presentations. These are a constant focus in discussion and questioning,</b></p> <p><b>Vocabulary Tier 3: Title slide in all shared resource presentations show the key vocabulary for each topic.</b></p> <p><b>Reading: Underlining command words,</b></p> <p><b>Writing: Modelling solutions</b></p> <p><b>Oracy: Think, pair, share, discussion, verbal feedback (peer to peer), questioning, student modelling</b></p>
<b>Becoming future ready</b>	<p><b>Personal Skills:</b> As a Mathematics student you will learn many skills: you will gain opportunities to listen to others supportively and to use questioning to develop your own understanding, you will learn how to cope with challenging questions and how to build up your resilience, you will get the chance to work on your own and with others. You will develop problem solving skills and you will learn how to break a problem down into</p>

	<p>smaller more manageable steps. You will learn how to collaborate with others when solving problems and you will learn how to articulate your solution to a problem.</p> <p><b>Employability:</b> Mathematical skills are invaluable in the workplace. There are many transferable skills which are much valued by employers. Specific career paths for each topic are discussed at the beginning of each unit of work.</p>
<b>Adaptation</b>	<ul style="list-style-type: none"> <li>• By progressive questioning: exploring pupils' understanding through interactive dialogue.</li> <li>• By outcome: different learners will produce different outcomes.</li> <li>• By resource: worksheets are clearly presented and accessible.</li> <li>• By intervention: by providing different levels of supervision and support.</li> <li>• By grouping/setting: according to prior attainment, gender, social preference, preferred learning style.</li> <li>• By offering optional activities: In class or as homework, to extend learning.</li> </ul>
<b>QFT/SEND Provision</b>	
<b>Implementation Curriculum Delivery</b>	<p><b><u>Unit 6 Working with circles.</u></b></p> <p>Pre-requisites</p> <ul style="list-style-type: none"> <li>• Substitution into formula</li> <li>• Fractions</li> <li>• Area of triangles and quadrilaterals</li> <li>• Angle rules</li> <li>• Volume of cuboids/prisms</li> </ul> <p>Foundation Tier (up to Grade 5)</p> <ul style="list-style-type: none"> <li>• Names of parts of a circle</li> <li>• Area and circumference of a circle</li> <li>• Area and arc length of sectors</li> <li>• Volume and surface area of cylinder</li> <li>• Extension: cones and spheres</li> </ul> <p>Additional content for Higher Tier (up to Grade 9)</p> <ul style="list-style-type: none"> <li>• Circle theorems</li> <li>• Area of frustrum</li> <li>• Problem solving including similarity.</li> </ul> <p><b><u>Unit 7 Vectors</u></b></p> <p>Pre-requisites</p> <ul style="list-style-type: none"> <li>• Coordinates</li> <li>• Ratio</li> <li>• Algebra</li> </ul> <p>Foundation Tier (up to Grade 5)</p> <ul style="list-style-type: none"> <li>• Translations</li> <li>• Adding, subtraction and multiplying vectors by a scalar.</li> <li>• Draw vector addition.</li> </ul> <p>Additional content for Higher Tier (up to Grade 9)</p> <ul style="list-style-type: none"> <li>• Vector geometry including ratio.</li> <li>• Vector proof</li> <li>• Colinear and parallel vectors</li> </ul> <p><b><u>Unit 8 Ratio and Fractions</u></b></p> <p>Pre-requisites</p> <ul style="list-style-type: none"> <li>• Fractions</li> <li>• Basic ratio</li> <li>• Simplifying ratio</li> <li>• Equivalent ratio</li> <li>• Ratio with recipes/proportion</li> </ul>
<b>Learning Outcomes (Knowledge)</b>	

	<p>Foundation Tier (up to Grade 5)</p> <ul style="list-style-type: none"> <li>• Share in a ratio.</li> <li>• Ratio problems</li> <li>• Combine a set of ratios.</li> <li>• Use 1:n and n:1</li> <li>• Currency conversions</li> <li>• Best buy problems.</li> </ul> <p>Additional content for Higher Tier (up to Grade 9)</p> <ul style="list-style-type: none"> <li>• Ratio in area and volume</li> </ul>
<b>Current learning to be developed in the future within:</b>	<p>Spring 1: Geometric reasoning: all key skills will be revised</p> <p>Y11 Spring 2: Transformations of shapes, loci and construction. More circle theorems.</p> <p>Y11 Spring 6: Proof including congruent triangles.</p>
<b>Assessment</b>	Refer to assessment maps for formative and summative assessment opportunities.
<b>Impact</b>	Attainment and Progress – Refer to assessment results / data review documentation.