**KEVICC Key Stage 4 Curriculum Subject:** Mathematics

**Autumn Half-Term**

**Term:** Year 11 Autumn Term – Block One | **Topic: Volume and Enlargement**

**What is the essential knowledge from this unit?**
**What do students need to remember and understand?**

| | Specification content | Specification notes |
|---|---|---|
| R12 | Compare lengths, areas and volumes using ratio notation<br>Make links to similarity and scale factors | |
| Students should be able to:<br>• understand the effect of enlargement on perimeter<br>• understand the effect of enlargement on areas of shapes<br>• understand the effect of enlargement on volumes of shapes and solids<br>• compare the areas or volumes of similar shapes<br>• understand, recall, and use trigonometry ratios in right-angled triangles. | | |
| G16 | Know and apply the formulae to calculate the volume of cuboids and other right prisms (including cylinders) | |
| Students should be able to:<br>• recall and use the formulae for the area of a rectangle, triangle, parallelogram and trapezium<br>• work out the area of a rectangle<br>• work out the area of a triangle<br>• work out the area of a parallelogram<br>• work out the area of a trapezium<br>• calculate the area of shapes made from triangles and rectangles<br>• calculate the area of compound shapes made from two or more rectangles, for example an L shape or T shape<br>• calculate the area of shapes drawn on a grid<br>• calculate the area of simple shapes<br>• work out the surface area of nets made up of rectangles and triangles<br>• recall and use the formula for the volume of a cube or cuboid<br>• recall and use the formula for the volume of a cylinder<br>• recall and use the formula for the volume of a prism<br>• work out the volume of a cube or cuboid<br>• work out the volume of a cylinder<br>• work out the volume of a prism, for example a triangular prism. | | |
| G17 | Calculate the volume of spheres, pyramids, cones and composite solids | including frustums |
| Students should be able to:<br>• work out the perimeter of a rectangle<br>• work out the perimeter of a triangle<br>• calculate the perimeter of shapes made from triangles and rectangles<br>• calculate the perimeter of compound shapes made from two or more rectangles<br>• calculate the perimeter of shapes drawn on a grid<br>• calculate the perimeter of simple shapes<br>• recall and use the formula for the circumference of a circle<br>• work out the circumference of a circle, given the radius or diameter<br>• work out the radius or diameter given the circumference of a circle<br>• use $\pi$ = 3.14 or the $\pi$ button on a calculator<br>• work out the perimeter of semicircles, quarter circles or other fractions of a circle<br>• recall and use the formula for the area of a circle<br>• work out the area of a circle, given the radius or diameter<br>• work out the radius or diameter given the area of a circle<br>• work out the area of semicircles, quarter circles or other fractions of a circle<br>• work out the surface area of spheres, pyramids, and cones<br>• work out the surface area of compound solids constructed from cubes, cuboids, cones, pyramids, cylinders, spheres, and hemispheres<br>• work out volume of spheres, pyramids, and cones<br>• work out the volume of compound solids constructed from cubes, cuboids, cones, pyramids, cylinders, spheres, and hemispheres<br>• solve real-life problems using known solid shapes. | | |
| N8 | Calculate exactly with multiples of $\pi$ | |
| Students should be able to:<br>• give answers in terms of π and use values given in terms of $\pi$ in calculations. | | |

**Key Vocabulary and notation.**

| | |
|---|---|
| Formula | Decagon |
| Area | Rectangle |
| Triangle | Estimate |
| Rhombus | Infinity |
| Trapezium | Radius |
| Trapezia | Diameter |
| Parallel | Tangent |
| Perpendicular | Arc |
| height | Sector |
| Compound | Segment |
| Component | Semi-circle |
| shapes | $\pi$ |
| Perpendicular | Approximately |
| Sector | Estimate |
| Equilateral | In terms of $\pi$ |
| Isosceles | Decimal |
| Scalene | place |
| Length | Estimate |
| Acute | Calculate |
| Obtuse | Substitute |
| Right-angle | Significant |
| Reflex | figures |
| Polygon | Cube |
| Square | Cuboid |
| Kite | Prism |
| Rhombus | Cylinder |
| Parallelogram | Pyramid |
| Trapezium | Cone |
| Polygon | Sphere |
| Edges | Hemi-spheres |
| Face | Uniform |
| Vertices | Cross-section |
| Vertex | Volume |
| Equal | Surface area |
| Triangle | Compound |

Mathematical questioning should be designed to unpick the structure of the maths and deepen the student's understanding. When students talk about mathematical concepts, they should develop the vital mathematical language that helps them explain their ideas fully.

Students are expected and encouraged to use terminology during all discussions, verbal feedback and in written content.

**What prior learning supports understanding of this content?**

- Recall and use the formulae for the perimeter and area of a rectangle, triangle, parallelogram, and trapezium
- Calculate the perimeter and area of shapes made from triangles and rectangles
- Calculate the perimeter and area of compound shapes made from two or more rectangles, for example an L shape or T shape
- Work out the circumference of a circle, given the radius or diameter
- Work out the radius or diameter given the circumference of a circle

**How does this content link to future learning?**

- Know the formulae for: Pythagoras' theorem, $a^2 + b^2 = c^2$, and the trigonometric ratios,

$\sin\theta = \frac{opposite}{hypotenuse}$ $\cos\theta = \frac{adjacent}{hypotenuse}$ $\tan\theta = \frac{opposite}{adjacent}$

apply them to find angles and lengths in right-angled triangles in two dimensional figures.

- Know the exact values of $\sin\theta$ and $\cos\theta$ for $\theta$ = 0°, 30° 45°, 60° and 90°
- Know the exact value of $\tan\theta$ for $\theta$ = 0°, 30°, 45° and 60°

**Reading**: *Where in the unit are students supported to read complex academic text?*

- Reading and understanding mathematical questions and problems' – teacher input.
- Decoding complex examination questions - explain what they are asking the student to do' – teacher input.
- Following instructions to solve problems - break down the tasks – teacher input.
- Recognising terminology, numbers, and symbols.

**Writing:** *Independent writing tasks and how they are structured*

- Using the correct subject specific terminology for numbers and symbols – examination papers, class books.
- Responding to questions that ask for an explanation or a reason – examination papers, class books.
- Self-evaluation, reviewing, reflecting and analysis of own work – class books, personalised learning checklists and analysis.
- Creating notes that can be used later for revision purposes - class books, revision cards, mind maps etc.

**Key assessments:**

How will do students review the information learned?

End of block assessments.

AQA end of block assessments provide a quick progress check at the end of each block of learning to make sure students have understood the content being covered. These are available for both foundation and higher tiers.

End of term/year assessments and mock examinations.

End of term assessments assessing the students' progress towards targets and provide diagnostic information to modify future teaching.

End of year 9 and 10 examinations assessing the students' progress towards targets and provide diagnostic information to modify future teaching.

Two mock examinations seasons take place during year 11 using previous years AQA 8300 examination papers. Students to experience the full suite of papers at both Foundation and higher tiers using Non-calculator and Calculator requirements.

All examinations will explore the three examination papers at both foundation and higher tiers using non-calculator and calculator requirements.

How will feedback be seen?

Marked end of block, term assessments and mock examinations.

Personalised learning checklists for all assessments identifying strengths and areas of development.

Written teacher feedback and marking in compliance with faculty and College Marking Policies. Student responses to marking. Students self-mark using purple pen. Verbal feedback given every lesson from teacher and peers as appropriate. Teacher and student self-assessment of presentation of class books will be completed to ensure written work is of high standard and students are achieving their potential.