KESTEVEN AND SLEAFORD HIGH SCHOOL

Mathematics Scheme of Learning

Year 8 – Term 4/Construction/Forming equations/Circles/Scale drawings

Intent – Rationale

Construction and Scale drawings studied in Year 8 provides many opportunities for students to recognise the application of maths they are studying. The locus of a fixed-point links to contexts such as the decision of where to build a new shop in a certain radius of a housing estate to optimise customers; draw accurate scale drawings with reference to design careers including architects, inventors, project managers; forming equations for practical situations. Extending to working in terms of π will link to their simplifying of algebraic expression.

Sequencing – what prior learning does this topic build upon?	Sequencing – what subsequent learning does this topic feed into?
• Year 7 term 6 construction, • Year 7 term 3 solving two step linear equations, Year 8 expressions and identities • Year 7 term 3 area and perimeter of a circle including ½, ¼ • Year 7 term 2 equivalent fractions, term 3 unit conversions, Year 8 term 2 proportion, term 3 bearings	• GCSE construction to solve scale drawing map problems • Year 9 solving any linear equation • Year 9 term 3 changing the subject of a formula • Year 9 term 1 area and perimeter of compound circles including sectors • GCSE bearings and scale diagram problems
What are the links with other subjects in the curriculum?	**What are the links to SMSC, British Values and Careers?**
• Art and Design and Technology • Scale factor for scale drawings • Construction strand of shape, measures and space • Geography • Working on scales • Science	• SMSC(C/SO) - Solving real life problems, a chance to put new skills in to context and reflect on how mathematics is relevant to everyday life • SMSC(SO) - Visualisation of 3D shapes and an appreciation that there are more than 3 dimensions and that mathematics can be used to solve problems in a multi-dimensional universe.

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• Forming and solving equations	• SMSC(C) - Discussion of different types of measurements, which units are used at home, comparison of metric and imperial units. • GB4d)e)f)g)I)
What are the opportunities for developing literacy skills and developing learner confidence and enjoyment in reading?	**What are the opportunities for developing mathematical skills?**
• **Flatterland by Ian Stewart** *Age 13+* In 1884, Edwin A. Abbott published “Flatland”; a brilliant novel about mathematics and philosophy that charmed and fascinated all of England. Now, Ian Stewart has written a fascinating, modern sequel to Abbott's book. Through larger-than-life characters and an inspired story line, "Flatterland" explores our present understanding of the shape and origins of the universe, the nature of space, time, and matter, as well as modern geometries and their applications	• Use of mathematical equipment protractor and compass • Greater understanding of scale and real life application

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Mathematics Scheme of Learning
Year 8 – Term 4

Intent – Concepts

What knowledge will students gain and what skills will they develop as a consequence of this topic?
National Curriculum 2014 Programme of Study Reference: Construct triangles with ruler, protractor and compasses, learn to draw and describe the locus of a point, learn to draw constructions with ruler and compasses Only apply formulae to calculate and solve problems involving: circumference and area of circles, calculate and solve problems involving: perimeters of 2-D shapes and composite shapes involving circles and part circles Converting lengths from scale drawings to real life and vice versa, drawing Diagrams to scale, interpreting scaled areas, make scale drawings to solve problems. **Know** Construct a locus of a fixed point and from a line, construct an angle bisector and perpendicular bisector, construct triangles using SSS Solve linear equations with brackets, fractions, unknowns on both sides, form an expression, form an equation Calculate the area and perimeter of a circle, calculate the area and perimeter of parts of a circle including ½ ¼ 1/8 Use a map scale to find real life distances and vice versa, draw and measure bearings accurately to 2 degrees. Draw the plan, side and front view of a 3D object. Draw the net(s) of a 3D object **Apply** Solve loci problems using the constructions Form a linear equation to solve a geometrical or worded problem

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Use formulae for area and perimeter of a circle to solve compound problems (1/4 ½ 1/8 only with quadrilaterals, triangles), working and giving answers in terms of π

Create and draw own map to scale

Extend

Create a compound shape using constructions

Draw scale diagrams using constructions and bearings

Algebraic circle area and perimeter problems

What subject specific language will be used and developed in this topic?	What opportunities are available for assessing the progress of students?
• Perpendicular, bisector, construct, loci, locus, equidistant, region, plan, elevation, circle, perimeter, circumference, diameter, radius, compound, area, scale, scale factor, ratio, proportional, equivalent, balanced	• Use of mini white boards e.g. show me an expression for… • Peer marking of accuracy of constructions and scale drawings • Mini quiz for equivalent ratios before scale drawings

Constructions	R	A	G
Construct a locus of a fixed point and from a line			
Solve basic loci problems			

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Construct an angle bisector and perpendicular bisector			
Construct triangles using SSS			

Forming and Solving Equations	R	A	G
Solve linear equations with brackets and with fractions			
Solve linear equations with unknowns on both sides			
Form an expression for a worded problem			
Form and solve an equation for a worded problem			

Circles	R	A	G
Calculate the area and perimeter of a circle			
Calculate the area of parts of a circle including ½ ¼ $^1/_8$			
Calculate the perimeter of parts of a circle including ½ ¼ $^1/_8$			

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Scale Diagrams, plans and nets	R	A	G
Use a map scale to find real life distances and vice versa			
Draw and measure bearings accurately to 2 degrees in the context of scale diagrams			
Draw the plan, side and front view of a 3D object			
Draw the net(s) of a 3D object			