KESTEVEN AND SLEAFORD HIGH SCHOOL

Mathematics Scheme of Learning

Year 8 – Term 6/Volume/Probability/Congruency/Transformations

Intent – Rationale

Pupils are familiar with probability scale, and can calculate simple theoretical probabilities, and this will allow progression to experimental probabilities, and learning the OR and AND rule for combined events. Pupils will also systematically list outcomes in a sample space diagram.
Pupils will recap their knowledge of finding the area of basic shapes (rectangles, parallelograms, circles and triangles) and be able to explain how finding the area of any 2D shape can help to find the volume of any 3D shape if we know its cross section (spheres, cones and pyramids will not be covered). Pupils will recap the four types of transformations and how to apply these including being able to fully describe a transformation that has already taken place, listing all key information; some pupils will apply this to negative and fractional enlargements. Congruency is a new topic and will build upon the previous topic of angle rules, and pupils will learn and identify the 4 conditions of congruency.

Sequencing – what prior learning does this topic build upon?	**Sequencing – what subsequent learning does this topic feed into?**
• Year 8 Term 1 Area • Year 7 Term 2 probability, Year 8 Term 3 fractions • Year 8 Term 3 angle notation • Year 7 Term 1 symmetry, KS2 transformations, Year 8 Term 6 congruency, Year 8 term 2 straight line graphs	• Year 9 Term 5 Volume • Year 9 Term 2 probability • Year 8 Term 6 transformations, Year 9 Term 4 construction triangles • GCSE transformations
What are the links with other subjects in the curriculum?	**What are the links to SMSC, British Values and Careers?**
Art • Transformation/tessellation of shapes (Escher) Design and Technology • Construction and transformations strands of shape, space and measures Science • Metric units	• GB4ef
What are the opportunities for developing literacy skills and developing learner confidence and enjoyment in reading?	**What are the opportunities for developing mathematical skills?**

• 'Alex's Adventure in Numberland' - Alex Bellows • 'The Math Book' - Clifford Pickover	New language around congruency. Development of spacial awareness, including reflecting and rotating objects.

Mathematics Scheme of Learning
Year 8 – Term 6

Intent – Concepts

What knowledge will students gain and what skills will they develop as a consequence of this topic?

National Curriculum reference:

Derive and apply formulae to calculate and solve problems involving volume of cuboids (including cubes) and other prisms (including cylinders).
Calculate probabilities of events with equally likely outcomes. Calculate probabilities of events not occurring by understanding that the probabilities of all possible outcomes sum to 1. Generate theoretical sample spaces for single and combined events with equally likely, mutually exclusive outcomes and use these to calculate theoretical probabilities
Draw accurate reflections on squared paper and by using co-ordinates with or without tracing paper. Investigation of reflections within shapes, on isometric paper and repeated reflections. Rotate shapes through angles which are a multiple of 90^{o}, be able to fully describe a rotation. Enlarge a shape by a scale factor with and without a centre of rotation including negative and fractional enlargements, be able to fully describe an enlargement.

Know

The formula for the area of basic shapes. Know and use the formula for the volume of a prism. Draw the net of a 3D shape. Draw 3D shapes on isometric paper.
Use probability notation to calculate theoretical probabilities of single and combined events. List outcomes systematically.
Know the 4 conditions of congruency. Use to identify congruent triangles.
Describe and draw objects using the 4 transformations separately and combined.

Apply

Find the volume of compound prisms. Solve capacity and other volume problems.
Calculate the expected frequency.

Extend

Find a missing dimension when the volume is known.

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Explain why two triangles are congruent, using angle facts. Draw enlargement with a negative scale factor. Describe reflections giving the equation of the mirror line (not x/y axis or y=x).	
What subject specific language will be used and developed in this topic?	**What opportunities are available for assessing the progress of students?**
Volume, cross-section, area, depth, height, length, squared metres, cubic metres, capacity. Equally likely outcomes, chance, likelihood, expected frequency, theoretical probability, experimental probability, relative frequency, estimate, mutually exclusive, sample space diagram. Outcomes, trial, event. Systematic. Congruent, similar shapes, condition, orientation. Rotate, reflect, enlarge, scale factor, vector, translate, centre of rotation, centre of enlargement, mirror line, rays, object, image, clockwise, anticlockwise.	• Half term unit test • Mid-term marking targets

Volume	R	A	G
Calculate the area of basic shapes including trapeziums and circles			
Use formulae to calculate the volume of a prism			
Solve volume problems including capacity problems			
Draw and label the net(s) for 3D shapes			
Draw 3D shapes on isometric paper			

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Probability	R	A	G
Calculate the theoretical probability of an event occurring			
Calculate the expected frequency			
Calculate the probability of combined events using the OR and AND rule			
List possible outcomes systematically			

Congruency	R	A	G
Know the 4 conditions of congruency			
Identify congruent triangles			
Give reason to congruent shapes			

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Transformations	R	A	G
Draw and describe translations			
Draw and describe reflections			
Draw and describe rotations			
Draw and describe enlargements			
Draw combined transformations			

Intent – Concepts

Lesson title	Learning challenge	Higher level challenge	Suggested activities and resources
Volume	Recap area of shapes, including trapeziums and circles Volume of a prism	Working backwards problems	HRE Y8 Volume PPT
	Volume of compound prisms		
	Context problems with capacity	Working backwards problems	
	Nets and isometric 3D drawings	Create own 3D object to draw	https://nrich.maths.org/6307 Visualising Nets Starter https://nrich.maths.org/7235 Wrapping Steps Problem (complex net)
Probability	Recap language and notation used. Calculate theoretical probability. Expected frequency	Probability games	HRE Y8 Probability PPT

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	Probability of combined events OR rule		
	Probability of combined events AND rule		
Congruency	Know the 4 conditions of congruency. Identify congruent triangles.		HRE Y8 Congruency PPT Give pupils individual different instructions to draw a given number of triangles. Don't look at partners. Then see who has the same (congruent conditions) or similar triangles (eg from AAA)
Transformations	Translation – draw and describe		HRE Y8 Transformations PPT
	Reflection – draw and describe	Describe mirror lines other than x/y axis and y=x	
	Rotation		
	Enlargement Fractional scale factors	What do you think happens if the SF is negative?	Ensure students are aware enlargement can make an object bigger or smaller.
	Combined Transformations		