Shape and Space Work Scheme (Pilot 2008-9)

Before starting this Intermediate (Level 2) FSMQ students should be able to:

- measure lengths in and understand common metric and imperial units (millimetres, centimetres, metres, inches, feet)
- be able to use a protractor to measure angles
- understand basic ideas of area and volume including use of correct units such as cm^2 and cm^3
- be able to interpret drawings including the use of basic plans and elevations drawn to scale.

A suggested work scheme showing topic areas and methods to be covered is given below. This recommends a total of 60 guided learning hours that could be timetabled in a variety of ways eg 2 hours per week for 30 weeks, 4 hours per week for 15 weeks, 5 hours per week for 12 weeks. Although the topic areas are listed separately below, it would be beneficial at times to use a variety of skills within a piece of work. For example the Nuffield resource 'Costing the Job' involves taking measurements from scaled drawings as well as finding areas and working out the cost of painting a house. Some terms and techniques should be introduced as soon as possible and used throughout the course. These include:

- geometrical terms: parallel, perpendicular, bisect, perpendicular bisector, mid-point, horizontal, vertical, line segment, line, similarity, congruence, regular, polygons (triangles including obtuse angled, acute angled, equilateral, isosceles and right angled, quadrilaterals including rectangle, square, parallelogram, rhombus, trapezium and kite, pentagons, hexagons, octagons), circumference, arc, sector, cuboids, prisms (including triangular), cylinders, spheres and hemispheres, cones.
- using appropriate instruments (ruler, tape measure, micrometer, protractor) to take measurements to appropriate levels of accuracy with appropriate units and correct notation
- checking calculations using estimation, inverse operations and alternative methods.

Topic Area	Content	Nuffield Resource
Plans and elevations (2 hours)	Identify and sketch objects from plans and elevations. Sketch plans and elevations of objects. Include sufficient dimensional information to allow drawings to be correctly interpreted.	**Points of View** (starter) Introduces the representation of objects by plans and elevations. Includes use of dotted lines for hidden edges.
Measure and calculate using scales (5 hours)	Measure lengths on scale drawings using scales given in the forms a:b, a to b, a/b for all a and b (and forms related to students' other work). Use scale drawings to solve problems, deciding on the correct arithmetic to use (including addition, subtraction, multiplication, division of lengths).	**Drawing Shapes in Word** (starter) Shows students some of the basic drawing techniques available in Word.
Draw scale diagrams (8 hours)	Draw plans and elevations of 3 dimensional situations using scales such as 2:5, 1:150, 10:1, 2 to 5, 1/3 (eg plans of rooms, elevations of front of buildings etc.). Use dashed lines to show hidden detail and shading for cross-sections. Include the use of a ruler and set-square to draw parallel and perpendicular lines where appropriate.	**Make your own shapes in Word** (skills activity) Activity that shows students how to draw their own shapes in Word, with and without gridlines.
Convert measurements (4 hours)	Convert within and between metric and imperial systems, including inches, feet, yards, miles. Include the use of conversion factors and formulae (eg L = 3.28l for converting metres to feet). Solve problems by carrying out calculations with measurements.	**Convert Lengths** (skills activity) Bingo and dominoes games providing practice in length conversions. **Convert It!** (skills activity) Interactive spreadsheet for practice in converting metric lengths and distances.

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