GEOMETRY

CURRICULUM PROGRESSION: TRACKING BACK

SINGLE-AGE CLASSES

Titles in the series

Number and Place Value

Addition and Subtraction (including algebra)

Multiplication and Division (including algebra)

Fractions, Decimals and Percentages (including ratio and proportion)

Measurement

Geometry

Statistics

Guidance page

This document aims to show the progression in learning within key areas of mathematics and where the linked teaching can be found within ESSENTIALMATHS. Its purpose is to support teachers to track back to appropriate starting points for pupils who are not currently able to access age-appropriate learning so that they can make appropriate adaptations for them. This document should supplement the information provided on the front cover of each ESSENTIALMATHS sequence, which identifies how learning builds within and between sequences.

In many circumstances, teachers will use the tracking back information to support them in providing appropriate scaffolding for pupils up and into new learning. In addition, it is also particularly helpful when making adaptations for pupils who are operating further away from age related expectations including pupils with SEND so that a clear progression can be seen for their learning.

This document will allow teachers to track back from any ESSENTIALMATHS sequence to see how the learning builds from Early Years across Primary so that an appropriate starting point and progression can be identified for all pupils.

The teaching of measurement has been separated into four related strands of learning. These strands are:

- Properties of 2-D shape
- Properties of 3-D shape
- Angles
- Position and translation

Within each strand, a short introduction outlines the focus of learning and highlights key building blocks and potential areas of weakness to support teachers in assessment and planning. A progression is then identified showing a breakdown of the small steps of learning and signposting where related teaching can be found within ESSENTIALMATHS referencing the learning sequence and step number. This includes links to earlier learning with Reception ESSENTIALMATHS and Essential Foundations for Counting (EFFC). Pre-requisite learning and opportunities for application are identified through highlighted rows in each progression.

Pre-requisite learning - learning that will be built on within the progression.
The link may be across domains and therefore refer to another booklet in the series.
The link may be across strands and therefore refer to another strand in this booklet.

Application
Learning is often highly connected, and applications may be made across domains and contexts. Where this is the case, the sequence and step numbers are highlighted blue so that teachers can decide whether to explicitly make these links or continue through the progression at any one point.

Properties of 2-D shape

Pupils need to build on skills of classification to identify and name 2-D shapes and their properties. One way that shapes can be classified is through looking at their angles and therefore there are links to the learning in **Angles** strand within this booklet. Once the properties of shapes are secure, these are used to support other learning such as to name faces in 3-D shape, to calculate missing angles and also to identify the position of points when a shape has been reflected or translated.

Pre-requisite learning	**EFFC:** Pattern, Classification and Comparison	
	R: RLS3 Comparison - Measures	
RLS5 Classification	Step 1	Identify objects that could be added to a set using criteria
	Step 2	Identify an attribute that enables a collection to be classified and then sort into those that belong and those that don't
	Step 3	Identify an attribute that enables a collection to be classified into multiple groups
	Step 4	Create sets where some objects don't meet any criteria and some create an intersection by meeting both
	Step 5	Compare the groups after being classified
1LS14 Geometry – names and properties of 2-D and 3-D shapes	Step 1	Understand what a mathematical shape is
	Step 2	Identifying 2-D shapes through their properties in an unfamiliar context
2LS36 Geometry – properties of 2-D and 3-D shape, classify and sort	Step 1	Naming 2-D shapes and their properties
	Step 3	Identifying and classifying shapes by their properties
2LS37 Geometry – symmetry	Step 1	Linking symmetry to halving
	Step 2	Identifying and sorting shapes - symmetry
	Step 3	Drawing symmetrical patterns and shapes
2LS39 Geometry – Sequencing	Step 1	Linear sequences
	Step 2	Patterns with shapes
Angles – a measure of turn		
3LS12 Angles, right angles and estimation	Step 3	Identify internal angles in 2-D shapes
	Step 4	Classifying shapes using internal angles as a property
Angles – perpendicular and parallel lines		
3LS13 Perpendicular and parallel lines	Step 4	Parallel and perpendicular (sides in shapes and lines)
3LS14 2-D shape – properties and drawing	Step 1	Connect the number of sides to the number of angles (and vertices) in a polygon
	Step 2	Classifying regular and irregular polygons
	Step 3	Drawing and constructing polygons (property focus on vertices and congruence)
	Step 4	Drawing and constructing polygons (properties)
3LS39 3-D shape – build and properties	Step 3	Describing the faces of polyhedra

4LS14 Properties of shape	Step 1	Revisiting properties of lines
	Step 2	Properties of shape – vocabulary focus
	Step 3	Classifying quadrilaterals
	Step 4	Drawing quadrilaterals
4LS15 Symmetry	Step 1	Recognising reflective symmetry in simple shapes
	Step 2	Recognising lines of symmetry in regular and irregular polygons
	Step 3	Constructing symmetrical shapes
	Step 4	Constructing quadrilaterals with a specific number of lines of symmetry
Angles – acute and obtuse		
4LS30 Geometry - angles	Step 3	Identifying acute and obtuse angles within geometric shapes
4LS31 Geometry – properties of triangles	Step 1	Describing the properties of triangles
	Step 2	Classifying triangles (equilateral, scalene or isosceles)
	Step 3	Classifying triangles according to more than one property
Position and translation – coordinates in the first quadrant		
4LS33 Geometry – position and direction incorporating angles and plotting points of a shape	Step 1	Plotting points to create polygons
	Step 2	Identifying coordinates to create polygons
5LS36 Distinguish between regular and irregular polygons	Step 1	Classify polygons as regular or irregular
	Step 2	Revisit 2-D shape vocabulary including regular and irregular
	Angles – draw angles	
	Step 3	Construct regular polygons, including using a protractor
5LS37 Use properties of rectangles	Step 1	Calculating missing lengths in rectangles and shapes
	Step 2	Using knowledge of rectangles and angles to calculate missing angles
6LS15 Properties of shape	Step 1	Using the language of 2-D shapes
	Step 2	Classifying 2-D shapes – triangles
	Step 3	Classifying 2-D shapes – quadrilaterals
	Step 4	Parts of circles
	Step 5	Use the relationship between radius and diameter
Position and translation – coordinates in all four quadrants		
6LS20 Reflection and translation	Step 3	Draw and label shapes in all four quadrants
	Step 4	Translate shapes in all four quadrants
	Step 5	Reflect shapes in all four quadrants
Fractions, Decimals and Percentages: Percentages – calculating percentages		
6LS32 Constructing pie charts	Step 2	Construct simple pie charts - constructing circles
	Step 3	Construct simple pie charts – divide a circle into segments

Properties of 3-D shape

Pupils need to build on skills of classification to identify and name 3-D shapes and their properties. This will build on the language and understanding within **Properties of 2-D shapes** within this booklet. Where 2-D shape understanding is insecure, this should be the starting point for pupils.

Once the difference between 2-D and 3-D shapes is established, nets provide an opportunity to further link these types of shapes. Pupils can find it hard to visualise nets and benefit from both building nets to create a shape and de-constructing a shape back into a net.

Pre-requisite learning	**EFFC: Pattern, Classification and Comparison**	
	R: RLS3 Comparison - Measures	
RLS5 Classification	Step 1	Identify objects that could be added to a set using given criteria
	Step 2	Identify an attribute that enables a collection to be classified and then sort into those that belong and those that don't
	Step 3	Identify an attribute that enables a collection to be classified into multiple groups
	Step 4	Create sets where some objects don't meet any criteria, and some create an intersection by meeting both
	Step 5	Compare the groups after being classified
1LS14 Geometry – names and properties of 2-D and 3-D shapes	Step 1	Understand what a mathematical shape is
	Step 2	Identifying 2-D shapes through their properties in an unfamiliar context
	Step 3	Classifying 3-D shapes
	Step 4	Exploring the shape of the faces on 3-D shapes
2LS36 Geometry – properties of 2-D and 3-D shape, classifying and sorting	Step 1	Naming 2-D shapes and their properties
	Step 2	Naming 3-D shapes and their properties
	Step 3	Identifying and classifying shapes by their properties
2LS39 Geometry – Sequencing	Step 1	Linear sequences
	Step 2	Patterns with shapes
3LS39 3-D shape – building and identifying properties	Step 1	Building three-dimensional shapes
	Step 2	Recognising three-dimensional shapes in different orientations
	Step 3	Describing the faces of polyhedra
	Step 4	Describing three-dimensional shapes
5LS24 3-D shapes from 2-D representations	Step 1	Define cuboids and cubes
	Step 2	Understand nets
	Step 3	Draw nets using given measurements
6LS15 Properties of shape	Step 6	Naming and identifying the properties of 3-D shapes
	Step 7	Building 3-D shapes from nets

Angles

Pupils will develop their sense of angles as a measure of turn through exploration and physically moving and turning. This will require a development of both spatial thinking and associated language. Pupils will also need to identify angles within shapes, and they can find it hard to make the connection to measure of turn. It can be helpful to follow the route of a shape and notice the turns that must be made.

Links with fractions are made as quarter, half and ¾ turns are made and these are then used as benchmarks to compare the size of angles to. Once angle knowledge is secure other learning is connected. For example, calculating missing angles within shapes and creating pie charts through understanding of proportion.

Pre-requisite learning	**EFFC: Pattern, Classification and Comparison**	
RLS8 Spatial Thinking	Step 1	Knowledge and application of the language of position
	Step 2	Knowledge and application of directional language in the real world
	Step 3	Comparing routes
	Step 4	Explaining routes and positions of objects in scaled versions of known environments
	Step 5	Explaining routes and positions of objects in represented known environments where objects are replaced by abstract symbols
1LS1 Geometry – Positional language including ordinal numbers	Step 1	Positional language
	Step 2	Turning
1LS31 Time: telling the time, o'clock and half past	Step 1	Clockwise and anti-clockwise turns
1LS34 Fractions of continuous quantities including capacity	Step 4	Fraction of a turn using the context of a clock face
Fractions, Decimals and Percentages: Fractions of quantities - ¼, ½ and ¾		
2LS19 Time - Telling the time to: o'clock, half past, quarter past and to	Step 1	Turns – quarter turn, half turn, three-quarter turn and full turn
2LS40 Geometry – rotation and right angles	Step 1	¼, ½ and ¾ turns clockwise and anti-clockwise
	Step 2	¼ turn = a right angle
	Step 3	Providing and following directions
3LS12 Angles, right angles and estimation	Step 1	Angles are measures of a turn
	Step 2	Comparing and ordering angles (using right angle as a benchmark)
	Step 3	Identify internal angles in 2-D shapes
	Step 4	Classifying shapes using internal angles as a property

3LS13 Perpendicular and parallel lines, horizontal and vertical lines	Step 1	Perpendicular lines are lines that will meet at a right angle to each other (where lines are vertical and horizontal)
	Step 2	Perpendicular lines are straight lines that will meet at a right angle to each other (where lines could also be diagonals)
	Step 3	Parallel lines are straight lines that have a constant distance between them and will never meet at a point
	Step 4	Parallel sides and sides that are perpendicular to each other in shapes and parallel and perpendicular lines on diagrams
	Step 5	Vertical lines are perpendicular to the horizon and horizontal lines are parallel to the horizon
3LS14 2-D shape – properties and drawing	Step 1	Connect the number of sides to the number of angles (and vertices) in a polygon
	Step 2	Classifying regular and irregular polygons
4LS30 Geometry - angles	Step 1	Comparing and ordering angles using the benchmark of a right angle
	Step 2	Identifying acute and obtuse angles
	Step 3	Identifying acute and obtuse angles within geometric shapes
5LS27 Estimate, compare, measure and draw angles	Step 1	Recap of prior angles learning including right angles and turns
	Step 2	Name, compare and order acute, obtuse, reflex and right angles
	Step 3	Measure angles accurately with a protractor
	Step 4	Estimate angles in degrees and check by measuring
	Step 5	Draw angles
5LS28 Identify Unknown Angles	Step 1	Angles in a right angle and on a straight line
	Step 2	Angles around a point or whole turn
5LS36 Distinguish between regular and irregular polygons	Step 1	Classify polygons as regular or irregular
	Step 3	Construct regular polygons, including using a protractor
5LS37 Use Properties of Rectangles	Step 2	Using knowledge of rectangles and angles to calculate missing angles rectangles
6LS19 Recognise and Find Angles	Step 1	Recognise and name angles
	Step 2	Investigate vertically opposite angles
	Step 3	Find missing angles from known facts
Fractions, Decimals and Percentages: Percentages – calculating percentages		
6LS32 Constructing pie charts	Step 2	Constructing simple pie charts. Part one – the process and constructing circles
	Step 3	Constructing simple pie charts. Part two – dividing up a circle into the segments

Position and translation

Initially, position builds on spatial thinking and language to describe position. As this develops, links are made to directions, turns and translations to describe how something can move position. Coordinates are then used to add precision and to identify exact positions. This knowledge is then combined with **Properties of 2-D shape** so that pupils can work out missing points for shapes on a coordinate grid.

Pre-requisite learning	**EFFC: Pattern, Classification and Comparison**	
RLS8 Pattern recognition	Step 1	Comparing patterns – what's the same/different?
RLS8 Spatial Thinking	Step 1	Knowledge and application of the language of position
	Step 2	Knowledge and application of directional language in the real world
	Step 3	Comparing routes
	Step 4	Explaining routes and positions of objects in scaled versions of known environments
	Step 5	Explaining routes and positions of objects in represented known environments where objects are replaced by abstract symbols
1LS1 Geometry – positional language including ordinal numbers	Step 1	Positional language
	Step 2	Turning
	Step 3	Postion – ordinal numbers
	Step 4	Position – ordinal numbers from left and right
	Step 5	Position – ordinal numbers within buildings
	Step 6	Position within a grid
1LS31 Time: telling the time, o'clock and half past	Step 1	Clockwise and anti-clockwise turns
1LS34 Fractions of continuous quantities including capacity	Step 4	Fraction of a turn using the context of a clock face
Fractions, Decimals and Percentages: Fractions of quantities - ¼, ½ and ¾		
2LS19 Time - Telling the time to: o'clock, half past, quarter past and to	Step 1	Turns – quarter turn, half turn, three-quarter turn and full turn
2LS39 Geometry – sequencing	Step 1	Linear sequences
	Step 2	Patterns with shapes
2LS40 Geometry – rotation and right angles	Step 1	¼, ½ and ¾ turns clockwise and anti-clockwise
	Step 2	¼ turn = a right angle
	Step 3	Providing and following directions

3LS13 Perpendicular and parallel lines, horizontal and vertical lines	Step 1	Perpendicular lines are lines that will meet at a right angle to each other (where lines are vertical and horizontal)
	Step 2	Perpendicular lines are straight lines that will meet at a right angle to each other (where lines could also be diagonals)
	Step 3	Parallel lines are straight lines that have a constant distance between them and will never meet at a point
	Step 4	Parallel sides and sides that are perpendicular to each other in shapes and parallel and perpendicular lines on diagrams
	Step 5	Vertical lines are perpendicular to the horizon and horizontal lines are parallel to the horizon
4LS32 Geometry – coordinates in first quadrant and translations	Step 1	Using coordinates to describe position on a 2-D grid
	Step 2	Describing movements between positions as translations
4LS33 Geometry – position and direction incorporating angles and plotting points of a shape	Step 1	Plotting points to create polygons
	Step 2	Identifying coordinates to create polygons
5LS25 Reflection and translation	Step 1	Translate shapes
	Step 2	Reflect patterns and shapes
	Step 3	Translate and reflect in the first quadrant
6LS20 Reflection and translation	Step 1	Draw and label axes in all four quadrants
	Step 2	Plot positions on the full coordinate grid
	Step 3	Draw and label shapes in all four quadrants
	Step 4	Translate shapes in all four quadrants
	Step 5	Reflect shapes in all four quadrants