STATISTICS

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 strands of learning. These strands are:

- Bar charts, pictograms and tables
- Continuous data
- Timetables
- Pie charts

Within each strand, a short introduction outlines the main 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 make reference to another booklet in the series.
The link may be across strands and therefore make reference 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.

Bar charts, pictograms and tables

In order for pupils to be able to interpret data represented in a variety of ways, they need to have a strong number sense which will be developed through their understanding of **Addition and Subtraction: Part whole** and **Equality.** They will also need to be able to understand the relative position of numbers within the number system, which will be developed through **Number and Place Value: Magnitude and Rounding**. Language of comparison will develop alongside understanding of other key concepts such as "sum" and "difference" through **Addition and Subtraction: Mental Addition and Subtraction**.

Pupils will benefit from multiple exposures to scales in context in order to be able to read graphic scales. The complexity of scales will increase alongside pupils understanding of **Multiplication and Division** and should build on understanding of skip counting and **Multiplication Facts** and then further through **Number and Place Value: Counting in Powers of 10**.

Pre-requisite learning	**EFFC: Comparison –** Use the language of comparison in context **Classification** – Identify same and different building to identify the set to be counted **Pattern** – Identify repeating unit in a pattern	
	Geometry: Position and translation – use ordinal numbers and describe position within a grid **Number and Place Value: Number Magnitude** – relative value of numbers to 20 and their position in the number system	
2LS5 Representing, ordering and comparing numbers to 100 and quantities for measures	Step 1	Ordering numbers
	Step 2	Ordering numbers represented in a variety of ways
	Step 3	< , > and = symbols
	Step 4	Order and comparing quantities for measures
2LS6 Estimation and Magnitude	Step 1	Placing numbers on a number line in the correct position
	Step 2	Using benchmarks to estimate values on a number line
	Step 3	Placing numbers proportionally correctly on a blank number lines using benchmarks
2LS9 Add and subtract numbers mentally using 1- and 2- digit numbers	Step 6	Difference
2LS10 Finding part or whole unknown	Step 6	Missing numbers in a range of contexts including measures
2LS12 Comparison (difference, more, less, fewer)	Step 1	Understand difference when comparing numbers on number lines to other models
	Step 2	Compare values in the context of measuring mass (g) and use the language of comparison
	Step 3	Compare values in the context of measuring mass (kg) and use the language of comparison
	Step 4	Compare values in the context of measuring heights, lengths and widths, using the language of comparison
	Step 5	Compare values in a variety of contexts

2LS13 Measures – Estimation and Measure Using Different Scales	Step 1	Estimate on a number line using benchmarks
	Step 3	Read capacities on different scales
	Step 4	Read scales on circular dials
	Step 5	Solve problems reading scales
2LS14 Problem solving with addition and subtraction in a range of contexts	Step 1	Tables for sorting
	Step 2	Information tables
	Step 3	Gathering data using tally charts
	Step 4	Representing data in block graphs
	Step 5	Pictograms
2LS18 Problem solving with addition and subtraction in a range of contexts	Step 5	Further problem solving within statistics
3LS11 Statistics – interpreting bar charts and tables	Step 1	Purpose of bar charts
	Step 2	Completing bar charts from information provided – identifying intervals of scales
	Step 3	Interpreting and inferring information from bar charts (including multi-step questions)
	Step 4	More complex bar chart problems
3LS19 Statistics – pictograms and scaled bar charts	Step 1	Making links between bar charts and pictograms
	Step 2	Completing pictograms from information provided
	Step 3	Interpreting and inferring information from pictograms (including multi-step questions)
4LS12 Discrete and Continuous Data (time graphs), including application of scales and division	Step 1	Interpreting discrete data – reading scales on pictograms and bar charts
	Continuous data – interpret continuous data (4LS12)	
	Step 3	Presenting data – choosing the best way to present it
4LS27 Statistics – Interpret and present continuous and discrete data, solve problems incorporating measures	Step 1	Understanding and interpreting discrete data
5LS16 Problem Solving – all four operations	Step 2	Interpreting statistical information
5LS38 Statistics – Solve comparison, sum and difference problems using information in a line graph	Step 1	Use data to make comparisons and calculate sum or difference
5LS39 Statistics – Interpreting and evaluating information presented in charts and tables	Step 1	Compare representations of data in text and tables
	Step 2	Choose appropriate data representations
	Step 3	Evaluate different data representations

6LS29 Statistics – Calculate and interpret mean average	Step 1	Understand and calculate the mean
	Step 2	Apply understanding of the mean
6LS33 Statistical representations	Step 1	Is all data fair?
	Step 2	More misleading graphs
	Step 3	Considering data which distorts
	Step 4	Applying skills

Continuous data

The ability to interpret continuous data builds on the previous strand and pupils' skills to interpret discrete data, use comparative language and apply understanding of mathematical concepts such as sum and difference. Pupils will particularly need to recognise when data is continuous and understand the number line as a continuum, with varying degrees of accuracy. This will be developed through age appropriate **Number and Place Value: Magnitude and Rounding** and then extending **into Fractions, Decimals and Percentages: Decimals.**

Pre-requisite learning	**Bar charts, pictograms and tables:** Read scales, use comparative language, interpret discrete data presented in a variety of ways	
4LS12 Discrete and Continuous Data (time graphs), including application of scales and division	Step 1	Interpreting discrete data – reading scales on pictograms and bar charts
	Step 2	Interpreting continuous data
	Step 3	Presenting data – choosing the best way to present it
4LS27 Statistics – Interpret and present continuous and discrete data, solve problems incorporating measures	Step 1	Understanding and interpreting discrete data
	Step 2	Identifying increase and decrease in line graphs
	Step 3	Time and distance graphs
	Step 4	Line graphs with constant relationship between variables
5LS16 Problem Solving – all four operations	Step 2	Interpreting statistical information
5LS38 Statistics – Solve comparison, sum and difference problems using information in a line graph	Step 1	Use data to make comparisons and calculate sum or difference
	Step 2	Use information in a line graph to compare and calculate
	Step 3	Solve problems using information in line graphs
5LS39 Statistics – Interpreting and evaluating information presented in charts and tables	Step 1	Compare representations of data in text and tables
	Step 2	Choose appropriate data representations
	Step 3	Evaluate different data representations
6LS27 Statistics – Interpret line graphs and pie charts	Step 3	Reviewing line graphs
	Step 4	Interpreting comparison graphs
	Step 5	Conversion graphs
6LS29 Statistics – Calculate and interpret mean average	Step 1	Understand and calculate the mean
	Step 2	Apply understanding of the mean
6LS30 Application of Previous Years' Learning	Step 3	Revise reading, writing, converting and applying understanding of time
6LS33 Statistical representations	Step 1	Is all data fair?
	Step 2	More misleading graphs
	Step 3	Considering data which distorts
	Step 4	Applying skills

Timetables

Timetables are a particular type of statistical representation. Their effective interpretation relies on a strong understanding of **Measurement: Time** including the ability to convert between representations of time and to calculate duration. Pupils will also need to be able to read data represented in tables and will benefit from plenty of opportunities to read discrete data presented in different ways and "real life" practice.

Pre-requisite learning	**Bar charts, pictograms and tables:** Read scales, interpret data represented in tables	
1LS15 Measures – The language of comparing length, height, mass and speed	Step 1	Using comparative language in the context of time
	Step 2	Ordinal numbers used to order timed events
1LS16 Sequencing events – days of the week & months of the year	Step 1	Days of the week
	Step 2	Events during the week
	Step 3	Months and seasons of the year
1LS31 Time: telling the time, o'clock and half past	Step 3	Telling the time – o'clock
	Step 4	Telling the time – half past
	Step 5	Intervals of time
2LS33 Time - Telling the time to the nearest 5 minutes	Step 1	Telling the time – o'clock and half past
	Step 2	Telling the time – quarter past the hour
	Step 3	Telling the time – quarter to the hour
	Step 4	Telling the time to the nearest 5 minutes
	Step 5	Intervals of time
3LS32 Time: telling the time (analogue and digital) and estimation	Step 1	Recognising intervals on an analogue clock
	Step 2	Telling the time to the nearest minute on an analogue and digital clock
	Step 4	Understanding am and pm
3LS33 Time - duration	Step 4	Duration of time
	Step 5	Finding unknown start and end times from given duration of events
	Step 6	Comparing the duration of events
4LS11 Measure – compare, estimate and calculate	Step 4	Calculating time addition (hours and minutes)
	Step 5	Calculating time subtraction (hours and minutes)
	Step 6	Calculating duration of time (hours and minutes)
4LS26 Time – read, write, calculate and convert time	Step 1	12- and 24-hour clock
	Step 2	Understanding and calculating duration
	Step 3	Find unknown start or end times when duration is known

5LS34 Reading timetables and calculating with time	Step 1	Exploring what we know about telling the time and converting units of time
	Step 2	Reading and interpreting timetables
	Step 3	Completing missing information in timetables
	Step 4	Solving problems involving completing and reading timetables and calculating with time
5LS39 Statistics – Interpreting and evaluating information presented in charts and tables	Step 1	Compare representations of data in text and tables
	Step 2	Choose appropriate data representations
	Step 3	Evaluate different data representations
6LS30 Application of Previous Years' Learning	Step 3	Revise reading, writing, converting and applying understanding of time

Pie charts

Pie charts are a particular type of statistical representation. Their effective interpretation relies on a strong understanding of **Fractions, decimals and percentages: Percentages** and the ability to consider how proportion can be represented in a variety of different ways.

A key element to understanding pie charts is to ensure that pupils focus on the whole that is represented. This is developed particularly through comparing pie charts representing different sample sizes and then considered in terms of how it can be exploited to mislead.

Pre-requisite learning	**Fractions, decimals and percentages** – Percentages	
2LS13 Measures – Estimation and Measure Using Different Scales	Step 1	Estimate on a number line using benchmarks
	Step 3	Read capacities on different scales
	Step 4	Read scales on circular dials
	Step 5	Solve problems reading scales
5LS16 Problem Solving – all four operations	Step 2	Interpreting statistical information
6LS27 Statistics – Interpret line graphs and pie charts	Step 1	Understanding pie charts
	Step 2	Interpreting a simple pie chart
	Step 4	Interpreting comparison graphs
6LS29 Statistics – Calculate and interpret mean average	Step 1	Understand and calculate the mean
	Step 2	Apply understanding of the mean
6LS32 Constructing pie charts	Step 1	Deciding whether a pie chart is appropriate
	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
6LS33 Statistical representations	Step 1	Is all data fair?
	Step 2	More misleading graphs
	Step 3	Considering data which distorts
	Step 4	Applying skills