



DEVELOPING NUMERICAL REASONING PUPIL LEARNING PATHWAY

WHAT IS YOUR NEXT STEP?

Criteria	WHITE	BRONZE	SILVER	GOLD
Identify processes and connections	transfer mathematical skills to a variety of contexts and everyday situations	transfer mathematical skills across the curriculum in a variety of contexts and everyday situations	transfer mathematical skills across the curriculum in a variety of contexts and everyday situations	transfer mathematical skills across the curriculum in a variety of contexts and everyday situations
		select, trial and evaluate a variety of possible approaches and break complex problems into a series of tasks	select, trial and evaluate a variety of possible approaches and break complex problems into a series of tasks	select, trial and evaluate a variety of possible approaches and break complex problems into a series of tasks
		prioritise and organise the relevant steps needed to complete the task or reach a solution	prioritise and organise the relevant steps needed to complete the task or reach a solution	prioritise and organise the relevant steps needed to complete the task or reach a solution
	choose an appropriate mental or written strategy and know when it is appropriate to use a calculator	choose an appropriate mental or written strategy and know when it is appropriate to use a calculator	choose an appropriate mental or written strategy and know when it is appropriate to use a calculator	choose an appropriate mental or written strategy and know when it is appropriate to use a calculator
		use a scientific calculator to carry out calculations effectively and efficiently using the available range of function keys	use a scientific calculator to carry out calculations effectively and efficiently using the available range of function keys	use a scientific calculator to carry out calculations effectively and efficiently using the available range of function keys
	select and use suitable instruments and units of measurement	identify, measure or obtain required information to complete the task	identify, measure or obtain required information to complete the task	identify, measure or obtain required information to complete the task
	identify the appropriate steps and information needed to complete the task or reach a solution	identify what further information might be required and select what information is most appropriate	identify what further information might be required and select what information is most appropriate	identify what further information might be required and select what information is most appropriate
	select appropriate mathematics and techniques to use	select appropriate mathematics and techniques to use	select appropriate mathematics and techniques to use	select appropriate mathematics and techniques to use
Represent and communicate	estimate and visualise size when measuring and use the correct units	estimate and visualise size when measuring and use the correct units	estimate and visualise size when measuring and use the correct units	estimate and visualise size when measuring and use the correct units
	explain results and procedures clearly using mathematical language	explain results and procedures precisely using appropriate mathematical language	explain results and procedures precisely using appropriate mathematical language	explain results and procedures precisely using appropriate mathematical language
	refine informal methods of recording written calculations, moving to formal methods of calculation when developmentally ready	refine methods of recording calculations	refine methods of recording calculations	refine methods of recording calculations
	use appropriate notation, symbols and units of measurement	use appropriate notation, symbols and units of measurement, including compound measures	use appropriate notation, symbols and units of measurement, including compound measures	use appropriate notation, symbols and units of measurement, including compound measures
	select and construct appropriate charts, diagrams and graphs with suitable scales	select and construct appropriate charts, diagrams and graphs with suitable scales	select and construct appropriate charts, diagrams and graphs with suitable scales	select and construct appropriate charts, diagrams and graphs with suitable scales
Review		interpret graphs that describe real-life situations, including those used in the media, recognising that some graphs may be misleading	interpret graphs that describe real-life situations, including those used in the media, recognising that some graphs may be misleading	interpret graphs that describe real-life situations, including those used in the media, recognising that some graphs may be misleading
	select from an increasing range of checking strategies to decide if answers are reasonable	select and apply appropriate checking strategies	select and apply appropriate checking strategies	select and apply appropriate checking strategies
	interpret answers within the context of the problem and consider whether answers, including calculator, analogue and digital displays, are sensible	interpret answers within the context of the problem and consider whether answers, including calculator, analogue and digital displays, are sensible	interpret answers within the context of the problem and consider whether answers, including calculator, analogue and digital displays, are sensible	interpret answers within the context of the problem and consider whether answers, including calculator, analogue and digital displays, are sensible
		verify and justify results or solutions, including discussion on risk and chance where relevant	verify and justify results or solutions, including discussion on risk and chance where relevant	verify and justify results or solutions, including discussion on risk and chance where relevant
	draw conclusions from data and recognise that some conclusions may be misleading or uncertain.	interpret mathematical information; draw inferences from graphs, diagrams and data, including discussion on limitations of data	interpret mathematical information; draw inferences from graphs, diagrams and data, including discussion on limitations of data	interpret mathematical information; draw inferences from graphs, diagrams and data, including discussion on limitations of data
	draw conclusions from data and recognise that some conclusions may be misleading or uncertain.	draw conclusions from data and recognise that some conclusions may be misleading or uncertain.	draw conclusions from data and recognise that some conclusions may be misleading or uncertain.	



**DEVELOPING NUMERICAL REASONING
PUPIL LEARNING PATHWAY**

Criteria	PLATINUM
Identify processes and connections	transfer mathematical skills across the curriculum in a variety of contexts and everyday situations
	select, trial and evaluate a variety of possible approaches and break complex problems into a series of tasks
	prioritise and organise the relevant steps needed to complete the task or reach a solution
	choose an appropriate mental or written strategy and know when it is appropriate to use a calculator
	use a scientific calculator to carry out calculations effectively and efficiently using the available range of function keys
	identify, measure or obtain required information to complete the task
	identify what further information might be required and select what information is most appropriate
	select appropriate mathematics and techniques to use
Represent and communicate	estimate and visualise size when measuring and use the correct units
	explain results and procedures precisely using appropriate mathematical language
	refine methods of recording calculations
	use appropriate notation, symbols and units of measurement, including compound measures
Review	select and construct appropriate charts, diagrams and graphs with suitable scales
	interpret graphs that describe real-life situations, including those used in the media, recognising that some graphs may be misleading
	select and apply appropriate checking strategies
	interpret answers within the context of the problem and consider whether answers, including calculator, analogue and digital displays, are sensible
	verify and justify results or solutions, including discussion on risk and chance where relevant
	interpret mathematical information; draw inferences from graphs, diagrams and data, including discussion on limitations of data
	draw conclusions from data and recognise that some conclusions may be misleading or uncertain.



USING NUMBER SKILLS PUPIL LEARNING PATHWAY


WHAT IS YOUR NEXT STEP?

Criteria	WHITE	BRONZE	SILVER	GOLD
Use number facts and relationships	read and write numbers to 1 million and numbers to 3 decimal places	read and write numbers of any size and use the four operations and the connections between them, e.g. apply division as the inverse of multiplication		
	use mental strategies to recall multiplication tables up to 10x10 and use to solve division problems	recognise and apply key mental facts and strategies	recognise and apply key mental facts and strategies	
	multiply numbers and decimals by a multiple of 10, e.g. 15 x 30, 1.4cm x 20	use appropriate strategies for multiplication and division, including application of known facts	use known facts to derive others, e.g. use 7 x 6 to derive 0.7 x 6	use powers and understand the importance of powers of 10
		use the terms square and square root	use the terms cube, cube root and reciprocal	show awareness of the need for standard form and its representation on a calculator
Fractions, Decimals, Percentages and Ratio	use understanding of simple fraction, decimal and percentage equivalences, e.g. find 25% of 60cm and know that this is equivalent to ¼ of 60cm	use equivalence of fractions, decimals and percentages to compare proportions recognise that some fractions are recurring decimals, e.g. 1/3 is 0.333	use equivalence of fractions, decimals and percentages to select the most appropriate for a calculation simplify a calculation by using fractions in their simplest terms	use equivalence of fractions, decimals and percentages to select the most appropriate for a calculation use and interpret different representations of fractions, e.g. mixed numbers and improper fractions
	calculate percentage quantities based on 10%, e.g. 20%, 5%, 15%	calculate percentages of quantities using non-calculator methods where appropriate	calculate a percentage, fraction, decimal of any quantity with a calculator where appropriate calculate the outcome of a given percentage increase or decrease	express one quantity as a percentage of another calculate a percentage increase or decrease
	use simple ratio and proportion	use ratio and proportion including map scales	use ratio and proportion to calculate quantities	use ratio and proportion to calculate quantities
Calculate using mental and written methods	add and subtract numbers using whole numbers and decimals	use efficient written methods to add and subtract numbers with up to 2 decimal places	use efficient written methods to add and subtract numbers with up to 2 decimal places	use efficient written methods to add and subtract numbers and decimals of any size, including a mixture of large and small numbers with differing numbers of decimal places
	multiply 2- and 3-digit numbers by a 2-digit number divide 3-digit numbers by a 2-digit number	multiply and divide 3-digit by 2-digit whole numbers, extending to multiplying and dividing decimals with 1 or 2 places by single-digit whole numbers multiply and divide whole numbers by 0.5, 0.2, 0.1	use efficient methods for multiplication and division of whole numbers and decimals, including decimals such as 0.6 or 0.06	multiply and divide whole numbers and decimals
		use the order of operations	use the order of operations including brackets	use the order of operations including brackets and powers
Estimate and check	check answers using inverse operations	use a range of strategies to check calculations including the use of inverse operations, equivalent calculations and the rules of divisibility		
	estimate by rounding to the nearest 10, 100, 1 000 or whole number	use rounding to estimate answers present answers to a given number of decimal places	use rounding to estimate answers to a given number of significant figures present answers to a given number of significant figures	make and justify estimates and approximations of calculations choose the appropriate degree of accuracy to present answers
Manage money	use the terms profit and loss in buying and selling activities and make calculations for this	use profit and loss in buying and selling calculations	carry out calculations relating to VAT, saving and borrowing	calculate using foreign money and exchange rates
	understand the advantages and disadvantages of using bank accounts	understand the advantages and disadvantages of using bank accounts, including bank cards	appreciate the basic principles of budgeting, saving (including understanding compound interest) and borrowing	understand the risks involved in different ways of saving and investing

make comparisons between prices and understand which is best value for money

make informed decisions relating to discounts and special offers

describe why insurance is important and understand the impact of not being insured

 USING NUMBER SKILLS PUPIL LEARNING PATHWAY	
Criteria	PLATINUM
Use number facts and relationships	use and interpret numbers in standard form within calculations
Fractions, Decimals, Percentages and Ratio	use and understand the idea of reverse percentage to find an original quantity
	use multipliers as an efficient method when working with percentages, e.g. multiply by 1.2 to increase an amount by 20%
	use and understand ratio and proportion in 2 dimensions
Calculate using mental and written methods	
Estimate and check	recognise and define limitations on accuracy of measurements
Manage money	use and understand efficient methods of calculating compound interest
	understand and demonstrate the real-life process of foreign exchange
	understand and calculate income tax



USING MEASURING SKILLS PUPIL LEARNING PATHWAY

WHAT IS YOUR NEXT STEP?

Criteria	WHITE	BRONZE	SILVER	GOLD
Length, weight/mass, capacity	read and interpret scales or divisions on a range of measuring instruments	read and interpret scales on a range of measuring instruments		
	record measurements in different ways, e.g. 1.3kg = 1kg 300g	convert between units of the metric system and carry out calculations	use the common units of measure, convert between related units of the metric system and carry out calculations	
	use the language of imperial units in daily use, e.g. miles, pints		use rough metric equivalents of imperial units in daily use	
		find perimeters of shapes with straight sides		find circumferences of circles
				make links between speed, distance and time
Time	time events in minutes and seconds to the nearest tenth of a second	measure and record time in hundredths of a second	interpret fractions of a second appropriately	
	estimate how long a journey takes, use and interpret timetables and schedules to plan events and activities and make calculations as part of the planning process	use time zones	use timetables and time zones to calculate travel time	
Temperature	measure and record temperatures involving positive and negative readings calculate temperature differences, including those involving temperature rise and fall across 0°C	record temperatures in appropriate temperature scales	convert temperatures between appropriate temperature scales	
Area and volume, angle and position	calculate the area of squares and rectangles	use formulae for the area of rectangles and triangles	calculate areas of compound shapes (e.g. consisting of rectangles and triangles) and volumes of simple solids (e.g. cubes and cuboids)	find areas of circles
	use grid references to specify location	measure and draw angles	use compass bearings and grid references to specify locations	apply understanding of bearings and scale to interpret maps and plans and to create plans and drawings to scale



USING MEASURING SKILLS PUPIL LEARNING PATHWAY

Criteria	PLATINUM
Length, weight/mass, capacity	understand and use a variety of compound measures
Time	
Temperature	
Area and volume, angle and position	apply proportional change to 2-dimensional designs



USING DATA SKILLS PUPIL LEARNING PATHWAY

WHAT IS YOUR NEXT STEP?



Criteria	WHITE	BRONZE	SILVER	GOLD
Collect and record, present and analyse data, interpret results		collect own data for a survey, e.g. through designing a questionnaire	plan how to collect data to test hypotheses	test hypotheses, making decisions about how best to record and analyse the information from large data sets
	represent data using: <ul style="list-style-type: none"> • lists, tally charts, tables, diagrams and frequency tables • bar charts, grouped data charts, line graphs and conversion graphs 	construct frequency tables for sets of data, grouped where appropriate, in equal class intervals (groups given) construct a wide range of graphs and diagrams to represent the data and reflect the importance of scale	construct a wide range of graphs and diagrams to represent discrete and continuous data construct frequency tables for sets of data in equal class intervals, selecting groups as appropriate construct graphs to represent data including scatter diagrams to investigate correlation	construct and interpret graphs and diagrams (including pie charts) to represent discrete or continuous data, choosing an appropriate scale use appropriate mathematical instruments and methods to construct accurate drawings
	extract and interpret information from an increasing range of diagrams, timetables and graphs (including pie charts)	interpret diagrams and graphs (including pie charts)	interpret diagrams and graphs to compare sets of data	
	use mean, median, mode and range to describe a data set	use mean, median, mode and range to compare two distributions (discrete data)	use mean, median, mode and range to compare two distributions (continuous data)	select and justify statistics most appropriate to the problem considering extreme values (outliers) examine results critically, select and justify choice of statistics recognising the limitations of any assumptions and their effect on the conclusions drawn



**USING DATA SKILLS PUPIL
LEARNING PATHWAY**

Criteria

PLATINUM

**Collect and record, present and analyse data,
interpret results**

understand slopes and gradients of
graphs and relate to compound
measures