VOCABULARY PROGRESSION

YEAR 1 TO YEAR 6

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Introduction

Teaching and learning mathematical language are key to developing deep mathematical understanding. The ability to use words to explain, justify and communicate mathematically is important to help pupils clarify and organise their mathematical schema. Fluency in mathematical language not only allows a pupil to communicate their understanding accurately but also relieves cognitive load, permitting more focus on the lengthier tasks. For example, procedural computations or multi-step problems.

How this booklet is organised

To help teachers introduce the correct vocabulary at the appropriate time, this booklet is organised firstly into year group focuses and then into strand focuses. The booklet assumes that the pupils have been introduced to and have understood all the previous years' vocabulary and it is now in regular usage. **Teachers should continue to use vocabulary from previous year groups and make explicit connections to new language.**

Words printed in red represent vocabulary introduced in ESSENTIALmaths earlier than National Curriculum requirements.

Words printed in blue represent vocabulary used in ESSENTIALmaths which are in addition to National Curriculum requirements.

Problems with learning mathematical language

1) Words with different specific mathematical meanings and meanings in everyday life.
    - ‘Product’ as the result of multiplication and ‘product’ as the outcome of a manufactured process
    - ‘Table’ as a way to organise information / data and ‘table’ as a household furniture item
    - ‘Cone’ as a shape and ‘cone’ as something edible
2) Words that are homophones
    - Pi and pie
3) Words that are closely related but have specific meanings
    - Circumference and perimeter
4) Concepts that can be expressed in multiple ways
    - ‘15 minutes past’ and ‘quarter past’
    - Add, total, altogether, sum, combined, extended etc.
5) Informal words which are not mathematically correct
    - ‘Diamond’ is used to describe a shape rather than ‘rhombus’
    - Sum is used to describe any calculation rather than precisely an addition situation

Ideas for teaching mathematical vocabulary

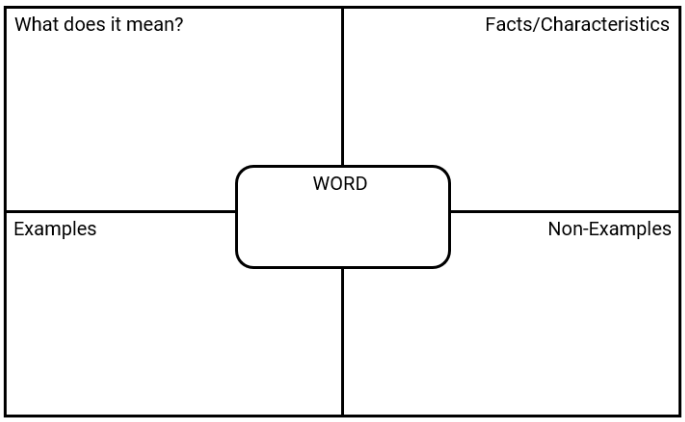
Step 1. Explicit instruction

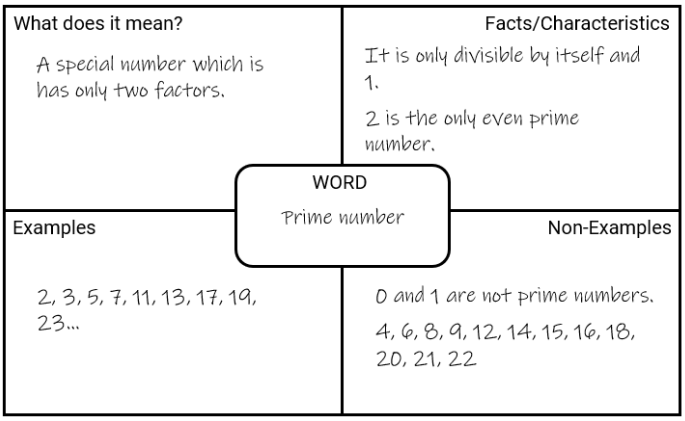
Pupils may naturally acquire new vocabulary through learning experiences. However, these experiences are not sufficient for many children. This is why the key first step in language teaching is explicit instruction. The new terminology needs to be introduced and explored in various ways by providing hands-on experiences if possible.

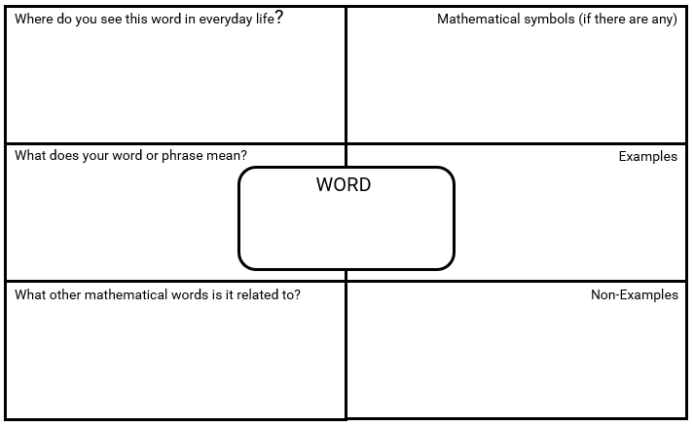
The second stage allows children to restate in their own words and connect it to their existing schema. This can be achieved in different ways. Such as:

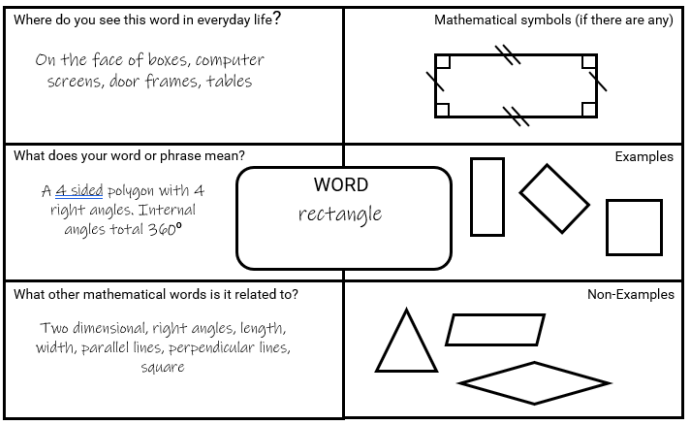
a) allowing pupils to rephrase it for someone else to understand. For examples, a younger child, a parent or the headteacher

b) combining pictures, symbols and words using 'Frayer' type models can be helpful, like those shown below.









Step 2. Building fluency and maintenance

Fluency in mathematics is often associated with base fact recall (such as times tables and number bonds) and procedural operations (such as column subtraction and long division).

Vocabulary should receive the same level of attention.

Like how fluency is achieved in other areas of mathematics, language fluency is achieved through carefully planned, purposeful and targeted practice.

1) Flashcards

The preparation of the flashcards is part of the process so do allow pupils to create their own. Using the flashcards in a traditional way allows immediate feedback. Pupils can sort the cards as they go allowing mastered vocabulary to be put to one side.
Flashcards have the disadvantage of disconnecting the word from the contexts in which it could be used.

2) Games

i) 'Don't say' / 'Forbidden' vocabulary

Played in a similar way to 'Taboo'.
Provide Pupil A with a keyword and four closely related words.
Pupil A must help Player B to guess the key word without saying the four closely related words.
The game can be adapted to provide more scaffolded support.
Player A is instructed to use all the provided words.

half/halve	• partial • part • split • share

ii) 'Headbands'

Played with keywords on cards.
Player A selects a card and places it on their forehead or on a headband so they cannot see it but the other players can.
Player A asks 'yes / no' questions until the key word is guessed.
The winner is the person who uses the fewest questions to guess their word.

iii) 'Charades'

Played with key word cards.
Players must act out the key word for the others to guess.
A version can be adapted and played by drawing pictures only.

iv) ‘Go fish’

Played with cards which include at least 12 pairs of cards

Card 1: key word

Card 2: related definition

The cards are shuffled, and the same number of cards are dealt to each player. The players look to match key words with definitions. If, once dealt, they have matching pairs in their hands then these can be put aside.

Pupils take turns to ask the next player if they have either a key word or the definition for a key word. If the addressed player does have the requested card, then they must hand it over. If they do not have the requested card, they declare 'Go fish'.

The asking player then picks any card, unseen, from another player. The winner is the first player to have no cards left in their hand.

v) ‘Memory game’

Played with cards like those in ‘Go fish’; pairs of keywords and matching definitions.

The cards are shuffled and then laid out in an array.

Player A turns over two cards. They keep the cards if they match a key word with the correct definition.

If they do not match, then the cards are turned back over, and the next player has a go.

The winner is the player with the most matched pairs.

vi) ‘Key word bingo’

Players select six key words from 12 possibilities and write them into a bingo card.

The teacher reads out definitions.

If a player has the matched keyword on their bingo board, they cross it out.

The first player to cross out all their key words wins.

INDEX BY YEAR GROUP

Year 1

Number: Counting and number properties		
number	twenty-one	even
count / counting	twenty-two	pattern
forwards	twenty-three	steps of
backwards	twenty-four	multiple
count on	*up to*	subitise
countback	ninety-nine	
zero	odd	
Number: Place value, ordering and comparing		
value	first	below
digit	second	middle
same	third	sort
different	fourth	sequence
one / ones	fifth	equivalent
ten / tens	*up to*	greater than >
hundred	twentieth	less than <
column	order	digit
one-digit	amount	consecutive
two-digit	size	greatest
more / more than	number line	benchmark
less / less than	larger / largest	near / nearer
fewer/ fewer than	bigger / biggest	far
equal / equal to / =	smaller / smallest	close to
not equal	estimate	
most	compare	
fewest	between	
least	above	
Number: Calculation		
total / in total	missing number problems	lots of
sum	left / leftover	groups of
plus	part	times
add / addition / +	whole	array
altogether	unknown	regroup / regrouping
combine	number sentence	addend
number bond	equal	subtrahend
difference	equally	minuend
distance between	unequal	bar model
subtract / subtraction / -	pair	remainder
minus	group / grouped	multiple / multiples
take away / taken away	grouping	
how much	share / shared	
how many	sharing	
bonds	double / doubling / doubles	
start / change/ result	twice as	
facts	each	
problems	half / halving / halves	

Fractions

half / halve / halves quarter / quarters one-quarter two-quarters three-quarters sharing group / groups	grouping part whole equal parts same size bar equal / equally	numerator denominator fraction notation: $\frac{1}{2}$ $\frac{1}{4}$

Measurement: Time

year month week day weekday weekend chronological order days of the week Monday Tuesday Wednesday Thursday Friday Saturday Sunday months of the year January February March April	May June July August September October November December night hour minute second morning afternoon evening yesterday today tomorrow before after	old / older new / newer clock / clock face o'clock half past birthday watch hour minute minutes past / to quarter past / to half past fast / faster /fastest quick / quicker / quickest slow / slower / slowest early earlier late later time

Measurement: Mass

weigh weight heavy heavier / heavier than heaviest	light lighter / lighter than lightest balance (weighing) scales	ruler mass gram kilogram

Measurement: Length

height long / longer / longest tall / taller / tallest short / shorter / shortest	wide / wider / widest narrow/ narrower/ narrowest centimetre metre	far distance measure

Measurement: Capacity		
volume full / fuller / fullest empty / emptier / emptiest	more than less than half full	half quarter capacity
Measurement: Money		
coin / coins note / notes amount penny / p pound / £	one penny two pence five pence ten pence twenty pence	fifty pence combination money

Geometry: Properties of shapes		
pattern 2-D rectangle / rectangles square / squares circle / circles kite / kites triangle / triangles 3-D cube / cubes cuboid / cuboids	pyramid / pyramids cylinder / cylinders sphere / spheres side / sides line straight curved flat open / closed shape corner	base point diagonal pentagon / pentagons hexagon / hexagons heptagon / heptagons octagon / octagons opposite
Geometry: Position and direction		
left right top middle bottom	on top of in front of behind between	above below beneath around

Year 2

Number: Counting and number properties		
numeral hundreds	step counting	count in multiples
Number: Place value, ordering and comparing		
place value partition place holder estimate estimation	half-way three-digit equivalent greater than >\ less than <	digit mid-point quartile
Number: Calculation		
commutative inverse calculate multiplication division times tables multiplication table repeated addition	reordering mental method written method reduce increase combination multiply / multiplied fact family	calculation divide remainder multiple / multiples rebalancing product divisible

Fractions		
two-quarters third one-third two-thirds equivalent / equivalence one whole one and a quarter	one and two-quarters one and a half one and three-quarters half as much twice as much numerator denominator	fraction notation: $\frac{1}{3}$ $\frac{2}{4}$ $\frac{3}{4}$

Measurement: Time		
analogue quarter past / to five / ten / past / to	clockwise anticlockwise noon	midday midnight intervals of time
Measurement: Mass		
gram / g	kilogram / kg	scale
Measurement: Length		
height width metre / m	centimetre / cm scale standard units	millimetre / mm

Measurement: Capacity		
litre / l millilitre / ml	scale quarter full	three-quarters full
Measurement: Money		
price cost	amount change	value
Measurement: Temperature		
temperature degrees	Celsius / ºC thermometer	scale

Geometry: Properties of shapes		
vertical horizontal Vertex / vertices edge / edges face / faces quadrilateral / quadrilaterals polygon / polygons pentagon / pentagons	hexagon / hexagons heptagon / heptagons octagon / octagons prism / prisms cone / cones symmetry line of symmetry surface	mirror line properties classify opposite regular irregular
Geometry: Position and direction		
sequence rotate rotation angle right angle	straight line arrange anti-clockwise row column	north south east west compass

Statistics		
pictogram tally chart tallies block diagram table data category / categories	key sorting totalling comparing horizontal vertical Venn diagram	Carroll diagram block graph scale title frequent survey axis / axes

Ratio and proportion
times as many for every

Year 3

Number: Counting and number properties		
one hundred and one one hundred and two one hundred and three *up to* one thousand	integer / integers decimal / decimals decimal notation	ascending descending
Number: Place value, ordering and comparing		
round / rounding / rounded approximately / ≈	nearest ten nearest hundred	nearest whole three-digit
Number: Calculation		
column addition column subtraction multiple(s) inverse operations remainder associative law short multiplication	base fact comparison long division correspondence scaling integer scaling quotient	statements derived facts formal written layout product divisible decomposition distributive law

Fractions		
fifths sixths sevenths eighths	ninths tenths order unit-fraction	non-unit fraction discrete continuous

Measurement: Time		
Roman numerals to XII am (ante meridiem) pm (post meridiem) duration	analogue clock digital digital clock 12-hour clock	24-hour clock event leap year
Measurement: Length		
perimeter	length	millimetre / mm

Geometry: Properties of shapes		
orientation degree / degrees angle right angle perpendicular parallel horizontal	vertical quadrilateral polyhedron polyhedral acute angle obtuse angle reflection	orientation three-dimensions right-angle triangle internal angle congruent
Geometry: Position and direction		
north east	south west	compass

Statistics		
bar chart block graph scale title	interpret frequent survey discrete data	continuous data label inferring

Year 4

Number: Counting and number properties		
thousands Roman Numerals (up to 100 / C)	negative numbers	positive numbers
Number: Place value, ordering and comparing		
nearest thousand four-digit		
Number: Calculation		
operation / operations methods	factor factor pairs	derive distributive law

Fractions		
hundredths decimal equivalents decimal places	decimal point proportion Convert	proper fractions improper fractions

Measurement: Time		
convert conversion		
Measurement: Length		
rectilinear figure area	dimensions	kilometre / km

Geometry: Properties of shapes		
classify nonagon / nonagons decagon / decagons isosceles scalene equilateral	parallelogram / parallelograms trapezium / trapeziums protractor adjacent regular irregular	rhombus / rhombuses geometric shapes internal angle congruent

Geometry: Position and direction		
co-ordinates pairs of coordinates/coordinate pairs first quadrant plot	grid translate translation axis / axes	scale label x-axis y-axis

Statistics		
label graph time graph	x-axis y-axis line graph	inferring variable

Algebra
variable rule

Year 5

Number: Counting and number properties		
ten thousand hundred thousand millions Roman numerals (up to 1000 / M) power / powers of	prime number complement composite (non-prime) square number square / squared / (d)^2	cube number cube / cubed / (d)^3 integer
Number: Place value, ordering and comparing		
nearest million nearest hundred thousand	linear sequence	equivalence
Number: Calculation		
prime factor common factor	short division long multiplication	dividend divisor

Fractions		
mixed numbers thousandths	per cent / %	percentages

Measurement: Mass		
pound / lb		
Measurement: Length		
composite metric units imperial units inch / inches / in	foot / feet / ft yard mile centimetre squared (cm^2)	metre squared (m^2) compound shape
Measurement: Capacity		
pint / pt	centimetres cubed (cm^3)	metres cubed (m^2)

Geometry: Properties of shapes		
diagonal point reflection straight line (180º) one whole turn (360º)	reflex angle regular polygon irregular polygon angles around a point	missing angle diagonal net

Geometry: Position and direction
x-axis y-axis

Statistics		
timetables two-way tables	axis	pie chart

Ratio
per

Algebra
equation

Year 6

Number: Counting and number properties
millions tens of millions
Number: Place value, ordering and comparing
interval multi-digit
Number: Calculation

long division common multiples order of operations	brackets abstract variables	BIDMAS

Fractions
simplify degrees of accuracy

Measurement: Mass
stones ounces
Measurement: Length
millimetres cubed (mm^3) kilometres cubed (km^3)
Measurement: Capacity

millimetres cubed (mm^3) centimetres cubed (cm^3)	metres cubed (m^3)	gallons
Measurement: Speed		
miles per hour (mph)	metres per second (m/s)	kilometres per hour (km/h)

Geometry: Properties of shapes		
dissect / dissection net radius diameter	circumference vertically opposite complementary angles dimensions	composite exterior angle intersect
Geometry: Position and direction		
co-ordinate plan four quadrants		

Statistics		
pie chart mean average	data set variable	conversion graph convert

Ratio		
times as many per for every relative size	scale factor proportion ratio (a:b) comparison	scaling scale factor part to part part to whole

Algebra		
symbol letter sequence algebraic / algebraically	equation unknown variable constant	generalise expression rule combinations

INDEX BY FOCUS

Number: Counting and number properties					
Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
number count / counting forwards backwards count on countback zero twenty-one twenty-two twenty-three twenty-four *up to* ninety-nine odd even pattern steps of multiple subitise	numeral hundreds step counting count in multiples	one hundred and one one hundred and two one hundred and three *up to* one thousand integer / integers decimal / decimals decimal notation ascending descending	thousands Roman numerals (up to 100 / C) negative numbers positive numbers	ten thousand hundred thousand millions Roman numerals (up to 1000 / M) power / powers of prime number complement composite (non-prime) square number square / squared / $(d)^2$ cube number cube / cubed / $(d)^3$ integer	millions ten million

Number: Place value, ordering and comparing					
Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
value digit same different one / ones ten / tens hundred column one-digit two-digit more / more than less / less than fewer/ fewer than equal / equal to / = not equal most fewest least first second third fourth fifth *up to* twentieth order amount size number line larger / largest	place value partition place holder estimate estimation half-way three-digit equivalent greater than > less than < digit mid-point quartile	round / rounding / rounded approximately / ≈ nearest ten nearest hundred nearest whole three-digit	nearest thousand four-digit	nearest million nearest hundred thousand linear sequence equivalence	interval multi-digit

bigger / biggest smaller / smallest estimate compare between above below middle sort sequence equivalent greater than >\ less than < digit consecutive greatest benchmark near / nearer far close to					

Number: Calculation					
Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
total / in total sum plus add / addition / + altogether combine number bond difference distance between subtract / subtraction / - minus take away / taken away how much how many bonds start / change/ result facts problems missing number problems left / leftover part whole unknown number sentence equal equally unequal pair group / grouped grouping	commutative inverse calculate multiplication division times tables multiplication table repeated addition reordering mental method written method reduce increase combination multiply / multiplied fact family calculation divide remainder multiple / multiples rebalancing product divisible	column addition column subtraction multiple(s) inverse operations remainder associative law short multiplication base fact comparison long division correspondence scaling integer scaling quotient statements derived facts formal written layout product divisible decomposition distributive law	operation / operations methods factor factor pairs derive distributive law	prime factor common factor short division long multiplication dividend divisor	long division common multiples order of operations brackets abstract variables BIDMAS

share / shared sharing double / doubling / doubles twice as each half / halving / halves lots of groups of times array regroup / regrouping addend subtrahend minuend bar model remainder multiple / multiples					

Fractions:					
Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
half / halve / halves quarter / quarters one-quarter two-quarters three-quarters sharing group / groups grouping part whole equal parts same size bar numerator denominator equal / equally fraction notation $\frac{1}{2}$ $\frac{1}{4}$	two-quarters third one-third two-thirds equivalent / equivalence one whole one and a quarter one and two-quarters one and a half one and three-quarters half as much twice as much numerator denominator fraction notation $\frac{1}{3}$ $\frac{2}{4}$ $\frac{3}{4}$	fifths sixths sevenths eighths ninths tenths order unit-fraction non-unit fraction discrete continuous	hundredths decimal equivalents decimal places decimal point proportion convert proper fractions improper fractions	mixed numbers thousandths per cent / % percentages	simplify degrees of accuracy

Measurement: Time					
Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
year month week day weekday weekend chronological order days of the week Monday Tuesday Wednesday Thursday Friday Saturday Sunday months of the year January February March April May June July August September October November December night hour	analogue quarter past / to five / ten / past / to clockwise anticlockwise noon midday midnight intervals of time	Roman numerals to XII am (ante meridiem) pm (post meridiem) duration analogue clock digital digital clock 12-hour clock 24-hour clock event leap year	convert conversion		

minute second morning afternoon evening yesterday today tomorrow before after old / older new / newer clock / clock face o'clock half past birthday watch hour minute minutes past / to quarter past / to half past fast / faster / fastest quick / quicker / quickest slow / slower / slowest early earlier late / later time					

Measurement: Mass					
Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
weigh weight heavy heavier / heavier than heaviest light lighter / lighter than lightest balance (weighing) scales ruler mass gram Kilogram	kilogram / kg scale			pound / lb	stones ounces

Measurement: Length

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
height long / longer / longest tall / taller / tallest short / shorter / shortest wide / wider / widest narrow / narrower/ narrowest centimetre metre far distance measure	height width metre / m centimetre / cm scale standard units millimetre / mm	perimeter length millimetre / mm	rectilinear figure area dimensions kilometre / km	composite metric units Imperial units inch / inches / in foot / feet / ft yard mile centimetre squared (cm^2) metre squared (m^2) compound shape	

Measurement: Capacity

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
volume full / fuller / fullest empty / emptier / emptiest more than less than half full half quarter capacity	litre / l millilitre / ml scale quarter full three-quarters full			pint / pt centimetres cubed (cm^3) metres cubed (m^3)	millimetres cubed (mm^3) centimetres cubed (cm^3) metres cubed (m^3) gallons

Measurement: Money					
Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
coin / coins note / notes amount penny / p pound / £ one penny two pence five pence ten pence twenty pence fifty pence combination money	price cost amount change value				

Measurement: Temperature					
Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
	temperature degrees Celsius / ºC thermometer scale				

Measurement: Speed					
Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
					miles per hour (mph) metres per second (m/s) kilometres per hour (km/h)

Geometry: Shape properties

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
pattern	vertical	orientation	classify	diagonal	dissect / dissection
2-D / two-dimensional	horizontal	degree / degrees	nonagon / nonagons	point	net
rectangle / rectangles	vertex / vertices	angle	decagon / decagons	reflection	radius
square / squares	edge / edges	right angle	isosceles	straight line (180º)	diameter
circle / circles	face / faces	perpendicular	scalene	one whole turn (360º)	circumference
kite / kites	quadrilateral / quadrilaterals	parallel	equilateral	reflex angle	vertically opposite
triangle / triangles	polygon / polygons	horizontal	parallelogram / parallelograms	regular polygon	complementary angles
3-D / three-dimensional	pentagon / pentagons	vertical	trapezium / trapeziums	irregular polygon	dimensions
cube / cubes	hexagon / hexagons	quadrilateral	protractor	angles around a point	composite
cuboid / cuboids	heptagon / heptagons	polyhedron	adjacent	missing angle	exterior angle
pyramid / pyramids	octagon / octagons	polyhedral	regular	diagonal	intersect
cylinder / cylinders	prism / prisms	acute angle	irregular	net	
sphere / spheres	cone / cones	obtuse angle	rhombus / rhombuses		
side / sides	symmetry	reflection	geometric shapes		
line	line of symmetry	orientation	internal angle		
straight	surface	three-dimensions	congruent		
curved / flat	mirror line	right-angle triangle			
open / closed shape	properties	internal angle			
corner	classify	congruent			
base	opposite				
point	regular				
diagonal	irregular				
pentagon / pentagons					
hexagon / hexagons					
heptagon / heptagons					
octagon / octagons					
opposite					

Geometry: Position and direction

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
left right top middle bottom on top of in front of behind between above below beneath around near close far up down forwards backwards inside outside clockwise repeated position direction movement whole turn quarter turn half-turn	sequence rotate rotation angle right angle straight line arrange anti-clockwise row column north south east west compass	north south east west compass	co-ordinates pairs of coordinates/ coordinate pairs first quadrant plot grid translate translation axis / axes scale label x-axis y-axis	x-axis y-axis	co-ordinate plane four quadrants

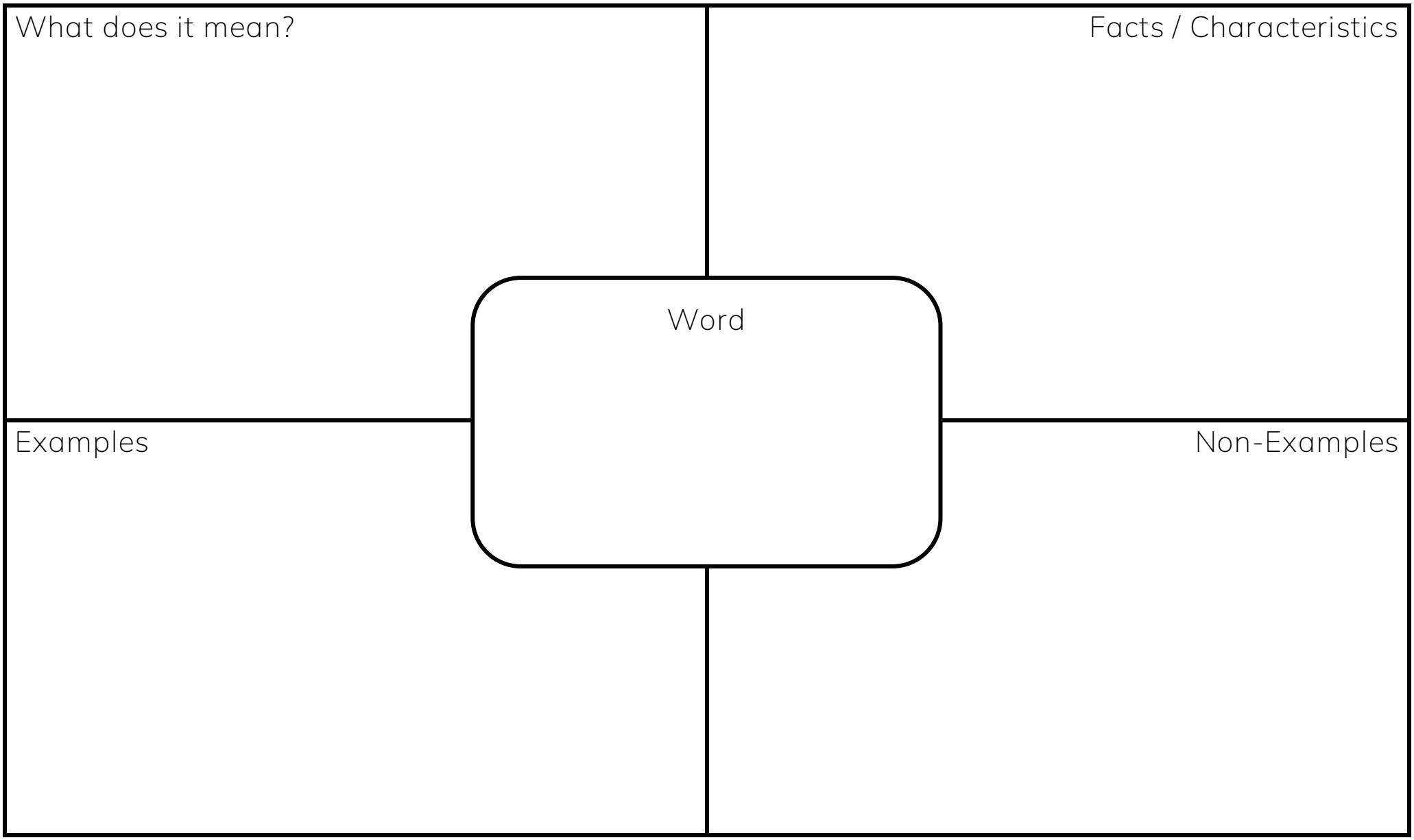
three-quarter turn full turn underneath to the side next anti-clockwise row column					

Statistics					
Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
	pictogram tally chart tallies block diagram table data category / categories key sorting totalling comparing horizontal vertical Venn diagram Carroll diagram block graph scale title frequent survey axis / axes	bar chart block graph scale title interpret frequent survey discrete data continuous data label inferring	label graph time graph x-axis y-axis line graph inferring variable	timetables two-way tables axis pie chart	pie chart mean average data set variable conversion graph convert

Ratio and proportion					
Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
	times as many for every			per	times as many per for every relative size scale factor proportion ratio (a:b) comparison scaling scale factor part to part part to whole

Algebra					
Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
			variable rule	equation	symbol letter sequence algebraic / algebraically equation unknown variable constant generalise expression rule combinations

Photocopiable resources



Where do you see this word in everyday life?		Mathematical symbols (if there are any)
What does your word or phrase mean?	Word	Examples
What other mathematical words is it related to?		Non-Examples