Glossary of Mathematics Mastery Terms used at Underhill

Mastery We think of mastery of a particular part of mathematics as the point when you can apply it to a totally new problem in an unfamiliar situation – it's not likely to happen at the end of a lesson or even a unit of work however is something we're all constantly striving to achieve.

The approach	
What we say	**What we mean**
C+P+A	To develop conceptual understanding of an idea or a procedure or a technique, firstly we should use **C**oncrete materials to represent it. When this is understood, we should then move on to a **P**ictorial representation, before we eventually extend our understanding to include **A**bstract forms. Most importantly, representing ideas in different forms helps to deepen our understanding and so enable us to apply ideas and skills in different contexts; it's not about C then P then A, but more C leading to C + P leading to C + P + A.
Depth	We're constantly striving to ensure that pupils have a real understanding of the mathematics they are learning. Rather than just a superficial ability to memorise or repeat sets of procedures (i.e. just 'do' the maths), we aim for pupils to engage at a deep level, understanding and explaining what they're doing and how and why it works. They recognise a concept in an unfamiliar context.
Fluency	Fluency is being flexible in the fundamentals of mathematics, having a deep conceptual understanding and being able to recall and apply knowledge rapidly and accurately.
Growth mindset	People with a growth mindset believe that and 'ability' to do something can be increased through effort; people with a fixed mindset think that 'ability' is innate and cannot be changed. We firmly believe that everyone can improve at mathematics – there's no 'maths gene' and sustained effort is the path the success. People believe that understanding usually requires effort, resilience and curiosity.
Key Constructs	The 'big ideas' in mathematics that are essential to understand to enable progress in the subject and to access other areas. These are the foci of our assessments.
Manipulatives	We often refer to the concrete materials that we use in representations – such as counters, blocks or straws as manipulatives; objects that we can we handle, feel, move around and manipulate so we can develop our physical understanding of maths concepts as the first part of the C+P+A journey.
Problem solving	Problem solving means applying mathematics to a variety of routine and nonroutine problems, including breaking down complex problems into a series of simpler steps and persevering in seeking solutions. Sometimes a problem can be in a real-life context, sometimes problems will just be within mathematics itself, e.g. looking at number patterns.
Reasoning	Reasoning in mathematics can be demonstrated by following a line of enquiry, making conjectures about relationships and/or generalisations. It includes developing the skills of presenting an argument and justifying a position using appropriate mathematical language and notation.

In lessons

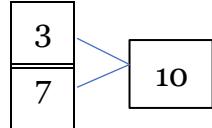| Lesson structure	
What we say	**What we mean**
Do now/ Fluency first	A short activity at the start of a lesson that pupils can engage with, probably without any input from the teacher. This can be something to prepare them for the material in the coming lesson or a more general activity to practise or develop fluency or keep key skills sharp.
Talk task/ Let's explore	Almost any task can be a 'talk task'. We always incorporate tasks into our lessons that provide pupils with opportunities to discuss the mathematics they are working on, so developing both their reasoning and mathematical communication skills.
Independent task	An independent task is one which pupils should be able to perform independently of the teacher – not necessarily of each other, as pair or group work may be useful in any part of the lesson and with any task.
Plenary	A summary after a key part of learning (which might be at any point of the lesson) that can, for example, review and assess progress; draw out key points from the lesson, etc.
In general	
What we say	**What we mean**
Bar modelling	This is a way of representing a problem using pictures. It is often a very useful way of making a complex word problem more accessible to pupils. Although it is not in itself a method of solution, by 'seeing' the problem in the visual form, it is then often easier for pupils to see how to approach the problem.
Concrete manipulative	Any physical object that is used to represent a mathematical concept is a concrete manipulative e.g. counters, bead strings, fraction towers, people, straws…The possibilities are endless.
Dienes blocks	Dienes blocks are concrete representations of numbers that are in exact proportion to each other, so they can represent all powers of tens, such as ones, tens, hundreds, thousands; hundredths, tenths, ones and tens; hundreds, thousands, tens of thousands, hundreds of thousands; etc. They help pupils to understand the relationship between place value columns and see why we can exchange e.g. one ten for ten ones.
Geoboard	A peg board used to illustrate, for example, properties of lines and shapes, counting, number, area, etc.
Odd one out	From a set of items, pupils are asked to identify which one is different from the others and why. There is often more than one answer and reason; this is useful in helping pupils to develop their reasoning.
'Same or different?' tasks	These are useful in developing reasoning: pupils are asked to compare two or more objects, expressions, representations, etc., and asked to identify what they have in common and how they differ.
Skip counting	Selecting a multiple and a starting point and then counting in that multiple, for example, skip counting in fives from one would be 1, 6, 11, 16, 21, 26, 31, etc.

Mathematics

The following glossary is not meant to be a used as a dictionary of mathematical terms but contains some of the terms that are frequently used by Mathematics Mastery. A full vocabulary list for each year group can be found on MyMastery. An example of a mathematical dictionary can be found at http://www.mathsisfun.com/definitions/.

What we say	What we mean
Addend	A number which is to be added to another, for example, in the equation 5 + 2 = 7, 2 is the addend.
Approximation	The number is not exact but is close, for example, if a journey takes 57 minutes, you might say that it takes approximately one hour.
Augend	A number to which another is to be added, for example, in the equation 5 + 2 = 7, 5 is the augend.
Cardinal number	When counting a set the last number counted refers to the total number of objects in a set, for example, set A contains two counters and one cube. It has a cardinality of three.
Conservation of number	Understanding that the number of objects in a set remains constant regardless of the arrangement.
Commutative	An operation, *, is commutative if for every pair of numbers a and b, a * b = b * a, i.e. the order doesn't matter. Addition and multiplication are commutative, for example, 3 + 4 = 4 + 3 and 15 × 65 = 65 × 15. Subtraction and division are not commutative.
Counterexample	An example which disproves a hypothesis or general statement. For example, if the hypothesis is that all prime numbers are odd, the counter-example of the prime number 2 disproves the hypothesis.
Dividend	The amount that you want to divide, for example, in '12 ÷ 3 = 4', 12 is the dividend.
Division (on a measurement scale)	The mark or line that denotes where a specific value is measured. Labelled divisions are usually larger, with unnumbered intermediate and smaller divisions provided to allow for greater accuracy.
Divisor	The number you divide by, for example, in '12 ÷ 3 = 4', 3 is the divisor.
Equal to	We refer to quantities being 'equal to' each other rather than 'equals' as this emphasises the fact that equality works in both directions e.g. consider the equation '4 + 1 = 3 + 2'. Both sides of the equation are 'equal to' each other, as both give the result 5.
Equation	Says that two things are equal. It will have an 'equal to' sign, for example, '8 – 3 = 5 × 1'.
Equivalent	Having exactly the same value, e.g., 12 ÷ 2 = 4 + 2.
Estimation	Make an approximate calculation, often based on rounding.
Exchange	Mainly used in subtraction to describe replacing a number with something of the same value e.g. one ten with ten ones. When subtracting, a ten is exchanged for ten ones. This can also be used in addition if, for example, you have a total of ten in the ones column you exchange the ten ones for a ten.
Expression	Numbers, symbols and operators grouped together but without the equal to sign, for example, '5 × 3 or 6 – 1'.
Factor	A number, that when multiplied with one or more other factors, makes a given number; for example, 2 and 3 are factors of 6 because 2 × 3 = 6.

Integer	A positive or negative whole number or zero.
Interval (on a measurement scale)	The space between two divisions on a scale, which represents a specific amount of what is being measured. The known interval between labelled divisions can be used to calculate the unknown intervals between unnumbered divisions.
Inverse operations	Two operations are inverses of each other, if when they are combined the number on which they operate, is unchanged. Addition and subtraction are inverse operations, for example, 8 + 9 – 9 = 8. Multiplication and division are inverse operations, for example, 7 × 11 ÷ 11 = 7.
Minuend	A number or quantity from which another number is to be subtracted. In the equation 10 – 6 = 4, 10 is the minuend.
More/fewer and greater/less	More and fewer are used when we talk about discrete data, i.e. objects that can be counted using positive whole numbers. Greater and less are used when we talk about continuous data, i.e. data that can take any value within a range.
Multiple	The result of multiplying a number by an integer, for example, 12 is a multiple of 3 and 4 because 3 × 4 = 12.
Non-example	An example which shows what something **is not**. This helps to clarify the intended object of learning. The integer 2 is a non-example of a fraction.
Number bond	A way of representing a number using a part-part-whole model; for example, if 3 and 7 are the parts, then the whole is ten. 3 7 10
Ones	We refer to the 'ones' place value column between 'tens' and 'tenths' as the use of the word 'units' is unnecessary and may be confusing; the 'unit' refers to the type of measure – cm, kg, etc., whereas we count in 'ones'.
Ordinal number	A term that describes a position within an ordered set, for example, first, second, third, fourth, etc.
Partitioning	A way of breaking a number into at least two parts resulting in a number bond for that number, for example, 12 is equal to ten and two.
Prime number	A whole number that has exactly two factors, itself and one. Examples: 5 (factors 5 and 1), 31 (factors 31 and 1). 57 is not prime (factors 57, 19, 3, 1)".
Product	The result you get when you multiply two numbers.
Proof	A formal mathematical argument that shows why a statement is always true.
Quotient	The result after you divide the dividend by the divisor, for example in '12 ÷ 3 = 4', 4 is the quotient.
Regroup	To re-combine a set into different groups e.g. twelve ones can be reorganised into one ten and two ones.
Rounding	A method used to approximate a number to the nearest appropriate power of ten, for example, 11.74: 11.74 ≈ 11.7 (rounded one decimal place) 11.74 ≈ 12 (rounded to the nearest whole number) 11.74 ≈ 10 (rounded to the nearest multiple of ten).
Subitise	The ability to instantaneously recognise the number of objects in a small group without the need to count them, for example, people generally subitise the number patterns on a die.
Subtrahend	A number or quantity to be subtracted from another number. In the equation 10 – 6 = 4, 6 is the subtrahend.
Sum	The result of adding two or more numbers. This is often used colloquially to mean any calculation, but 'sum' should only be used for addition.
Vinculum	The horizontal line used to separate the numerator and denominator in a fraction.