SYLLABUS GUIDE / OCTOBER 2026

Practice syllabus.

Skills. Starting points. Practice levels.

A guide to the shared arithmetic practice in Numina and Numina for Schools.

27	81	3
ARITHMETIC SKILLS	PRACTICE LEVELS	CONNECTED TRACKS

What this guide provides

Find each skill, the knowledge to check first, the three practice levels and a sample task. Use the curriculum links to locate related content in your teaching programme.

How it fits

Numina supports practice alongside teaching. This is an arithmetic practice syllabus, not a complete mathematics course. The companion white paper explains the research basis and measurement limits.

FIND YOUR WAY

02 Skill directory
03 Choosing a starting point
04-05 Core Facts
06-10 Mental Strategies
11-13 Applied Fluency
14-15 Curriculum connections
16 Progression and timing

For educators, parents and tutors. Edition: 18 October 2026.

Outside this syllabus: geometry, measurement, statistics, probability, wider algebra, extended problem solving and proof. These require other teaching and assessment.

02 / THE SYLLABUS

Find the skill you need

Three tracks organise the content. Their order is a useful map, not a compulsory route through every skill.

F / Core Facts

F1 Addition Facts

F2 Subtraction Facts

F3 Multiplication Facts

F4 Division Facts

F5 Number Bonds

A / Applied Fluency

A1 Fractions, Decimals & Percents

A2 Fractions & Percents

A3 Percentage Increase & Decrease

A4 Integer Operations

A5 Multi-Step Calculations

A6 Ratio & Proportional Reasoning

A7 Fraction Arithmetic

A8 Decimal Arithmetic

M / Mental Strategies

M1 Place Value & Decimals

M2 Doubling, Halving & Number Relationships

M3 Number Decomposition & Friendly Numbers

M4 Two-Digit Mental Maths

M5 Multiplication Strategies

M6 Mental Multiplication: 2-Digit × 1-Digit

M7 Mental Division Strategies

M8 Estimation

M9 Squares, Cubes & Roots

M10 Number Structure (Primes, Factors, Multiples)

M11 Simplifying Fractions

M12 Number Sense & Magnitude

M13 Number Sequences

M14 Rounding

How to read a level

M4.2 means Mental Strategies, skill 4, level 2. Levels **1, 2 and 3** correspond to **Beginner, Intermediate and Advanced** within each skill. They are not school year groups or grades.

Each skill page gives a practice focus, suggested prior knowledge and three example forms. Examples illustrate the content; choices and interface details are omitted.

03 / PLANNING PRACTICE

Choose a manageable start

Begin with the mathematics the learner understands. Use their current work and explanations to choose practice.

Practice focus	Check these foundations	Possible next skills
Addition and subtraction	Counting, place value and operation meanings	F1-F2 → F5 / M3 → M4
Multiplication and division	Equal groups and inverse operations	F3-F4 → M2 → M5-M7
Decimals	Tenths, hundredths and number size	M1 → M14 / A8
Fractions and percentages	Equal parts, equivalence and division	M10-M11 → A1-A2 → A3 / A7
Ratio	Multiplication, division and equivalent ratios	F3-F4 / M10 → A6
Expressions and patterns	Operation rules and relevant number facts	M9 / A4 → A5; M13 as relevant

These are suggested connections, not app unlock rules or a fixed teaching sequence. Revisit a foundation when it helps; learners need not complete a whole track before working elsewhere.

Before practice

Check that the learner understands the notation, can explain a method and can enter or select an answer. Start with a form they can attempt independently. If the method is unfamiliar, teach or revisit it before timed practice.

After a session

Look at mistakes as well as pace. Ask how an answer was found. Repeated difficulty may call for a simpler form, a worked example or further teaching.

Across sessions

Return to relevant skills and include related forms once they are understood. Adjust the mix to the learner and your curriculum. This guide does not prescribe a validated number of minutes or weeks.

Access and readiness

Reading, language, movement and input needs can affect timing. Use untimed work or discussion outside the app when needed to understand the mathematics. No age range or grade placement is validated by this guide.

04 / CORE FACTS

Addition, subtraction and multiplication

Base times are reference settings. Some forms have a different allowance; use the target shown for the question. See page 16.

F1 / Addition Facts

Practise addition facts, missing parts and short sums.

Check first: Counting, combining groups and reading + and =.

Level	Practice content	Example	Base time
F1.1	Sums to 10	3 + 7	6 s
F1.2	Sums past 10: doubles, near-doubles, bridging ten	8 + 5	5 s
F1.3	A missing addend, three numbers, bridging ten	4 + 6 + 8	6 s

F2 / Subtraction Facts

Practise subtraction facts and missing numbers.

Check first: Taking away, finding a difference and the link with addition.

Level	Practice content	Example	Base time
F2.1	Take away within 10, no exchange	9 – 4	6 s
F2.2	Teen numbers, exchanging through ten	14 – 7	5 s
F2.3	More demanding exchanges; a missing part	15 – ? = 7	4 s

F3 / Multiplication Facts

Practise multiplication facts through the 12 times table.

Check first: Equal groups, arrays and the meaning of multiplication.

Level	Practice content	Example	Base time
F3.1	The 1, 2, 5 and 10 tables	5 × 7	6 s
F3.2	The 3, 4, 6, 7, 8, 9, 11 and 12 tables	7 × 8	5 s
F3.3	A factor missing	? × 7 = 56	4 s

05 / CORE FACTS

Division and number bonds

Base times are reference settings. Some forms have a different allowance; use the target shown for the question. See page 16.

F4 / Division Facts

Practise division facts and their links to multiplication.

Check first: Equal sharing, grouping and related multiplication facts.

Level	Practice content	Example	Base time
F4.1	Dividing by 2 to 6	35 ÷ 5	7 s
F4.2	Dividing by 7 to 12	56 ÷ 7	5 s
F4.3	A number missing, every divisor	56 ÷ ? = 8	4 s

F5 / Number Bonds

Find the missing amount needed to reach a given total.

Check first: Place value in tens and hundreds; related addition and subtraction.

Level	Practice content	Example	Base time
F5.1	Bonds to 100 in tens	30 + ? = 100	7 s
F5.2	Bonds to 100 from any number	37 + ? = 100	6 s
F5.3	Bonds to 200 and 1000	350 + ? = 1000	5 s

Connect the facts

Use explanations alongside answers. For example, ask how a multiplication fact helps with a division fact, or how a number bond can be checked by subtraction. This conversation provides information that a timed answer alone does not.

06 / MENTAL STRATEGIES

Place value and number relationships

Base times are reference settings. Some forms have a different allowance; use the target shown for the question. See page 16.

M1 / Place Value & Decimals

Scale numbers using place value, including decimals.

Check first: Tens and ones, then tenths and hundredths.

Level	Practice content	Example	Base time
M1.1	Whole numbers × and ÷ 10	47 × 10	8 s
M1.2	One decimal place × 10; adding tenths	4.7 × 10	7 s
M1.3	× and ÷ 100, × 0.1	47 ÷ 100	6 s

M2 / Doubling, Halving & Number Relationships

Double and halve whole numbers and decimals.

Check first: Addition of equal amounts; division into two equal parts.

Level	Practice content	Example	Base time
M2.1	Double and halve small numbers	Double 7	7 s
M2.2	Two-digit numbers, halves that end in .5	Half of 37	6 s
M2.3	Decimals and odd two-digit numbers	Double 3.7	5 s

M3 / Number Decomposition & Friendly Numbers

Split numbers, complete totals and adjust from a nearby round number.

Check first: Place value, addition facts and number bonds.

Level	Practice content	Example	Base time
M3.1	Missing part to a round number	40 + ? = 67	8 s
M3.2	Complete to the next ten	? + 8 = 30	7 s
M3.3	Add or subtract a number near a hundred, then adjust	198 + 57	6 s

07 / MENTAL STRATEGIES

Addition and multiplication

Base times are reference settings. Some forms have a different allowance; use the target shown for the question. See page 16.

M4 / Two-Digit Mental Maths

Add and subtract two-digit numbers using mental methods.

Check first: Partitioning into tens and ones; bridging a multiple of ten.

Level	Practice content	Example	Base time
M4.1	Teens with two-digit numbers	14 + 30	9 s
M4.2	Bridging and exchanging	47 + 36	8 s
M4.3	Past 100, and three-term chains	45 + 38 – 24	7 s

M5 / Multiplication Strategies

Use number relationships to simplify multiplication.

Check first: Multiplication facts, doubling, halving and place value.

Level	Practice content	Example	Base time
M5.1	× 5 and × 11	8 × 5	8 s
M5.2	× 12, × 15 and × 25	14 × 25	7 s
M5.3	Larger numbers, × 125	32 × 25	6 s

M6 / Mental Multiplication: 2-Digit × 1-Digit

Multiply a two-digit number by one digit using parts of the number.

Check first: Multiplication facts and multiplication of tens.

Level	Practice content	Example	Base time
M6.1	A tens number × a digit	60 × 7	8 s
M6.2	Two-digit multiplication without carrying	32 × 3	10 s
M6.3	Two-digit multiplication by partitioning	67 × 8	10 s

08 / MENTAL STRATEGIES

Division, estimation and powers

Base times are reference settings. Some forms have a different allowance; use the target shown for the question. See page 16.

M7 / Mental Division Strategies

Use related calculations to divide by selected numbers.

Check first: Division facts, halving and the multiplication-division relationship.

Level	Practice content	Example	Base time
M7.1	÷ 4 by halving twice, ÷ 5	48 ÷ 4	10 s
M7.2	÷ 8 and ÷ 25	144 ÷ 8	9 s
M7.3	÷ 25, ÷ 50, ÷ 125	750 ÷ 25	8 s

M8 / Estimation

Estimate the size of an answer to a calculation.

Check first: Place value and rounding; relevant operation facts.

Level	Practice content	Example	Base time
M8.1	Round to tens, then choose	38 + 41 ≈ ?	8 s
M8.2	Products of two-digit numbers; three-digit sums	78 × 68 ≈ ?	7 s
M8.3	Three-digit products and two steps	402 × 38 ≈ ?	6 s

M9 / Squares, Cubes & Roots

Practise square and cube values and recognise their roots.

Check first: Multiplication and the meaning of powers and roots.

Level	Practice content	Example	Base time
M9.1	Squares to 10^2, cubes to 5^3	7^2	8 s
M9.2	Squares to 15^2, square roots	$\sqrt{144}$	7 s
M9.3	Squares to 25^2, cubes to 10^3, their roots	$\sqrt{441}$	6 s

09 / MENTAL STRATEGIES

Structure, fractions and magnitude

Base times are reference settings. Some forms have a different allowance; use the target shown for the question. See page 16.

M10 / Number Structure (Primes, Factors, Multiples)

Identify primes and factors; find common factors and multiples.

Check first: Multiplication and division facts; factor and multiple vocabulary.

Level	Practice content	Example	Base time
M10.1	Is it prime? How many factors?	Is 17 prime?	6 s
M10.2	Least common multiple (LCM); highest common factor (HCF)	LCM of 6 and 8	8 s
M10.3	HCF, LCM and the missing prime factor	48 = 2 × 2 × 2 × 2 × ?	10 s

M11 / Simplifying Fractions

Recognise and produce equivalent fractions in simplest form.

Check first: Fraction equivalence and common factors.

Level	Practice content	Example	Base time
M11.1	Is it already simplest?	Is 6/8 in simplest form?	8 s
M11.2	Common factors up to 6	12/18 in simplest form	7 s
M11.3	Simplify in one division, using a factor up to 12	27/36 in simplest form	6 s

M12 / Number Sense & Magnitude

Compare number sizes and estimate the magnitude of products.

Check first: Place value; fraction and decimal comparison; powers for later forms.

Level	Practice content	Example	Base time
M12.1	Which is larger, across forms	Which is larger: 1/2 or 0.6?	8 s
M12.2	How many digits in a product	How many digits does 47 × 83 have?	7 s
M12.3	Digits in a product of three; which power is larger	How many digits in 78 × 64 × 12	6 s

10 / MENTAL STRATEGIES

Sequences and rounding

Base times are reference settings. Some forms have a different allowance; use the target shown for the question. See page 16.

M13 / Number Sequences

Identify number patterns and continue or complete sequences.

Check first: Addition and multiplication patterns; squares for later forms.

Level	Practice content	Example	Base time
M13.1	Same step each time	3, 7, 11, 15, ?	9 s
M13.2	Bigger steps, doubling, a missing middle	3, 6, 12, 24, ?	8 s
M13.3	Square, triangular and second-order sequences	1, 4, 9, 16, ?	7 s

M14 / Rounding

Round whole numbers and decimals to a stated precision.

Check first: Place value; introduce decimal places and significant figures before later forms.

Level	Practice content	Example	Base time
M14.1	Nearest 10, 100 and 1000	Round 2651 to the nearest 100	6.5 s
M14.2	Whole numbers or 1 decimal place, including carrying	Round 3.96 to 1 decimal place	7 s
M14.3	2 decimal places, significant figures	Round 0.00472 to 2 significant figures	9 s

Keep the language clear

A sequence rule describes how the terms change. Decimal places count positions after the decimal point; significant figures count from the first non-zero digit. Check these meanings before using the later forms.

11 / APPLIED FLUENCY

Fractions and percentages

Base times are reference settings. Some forms have a different allowance; use the target shown for the question. See page 16.

A1 / Fractions, Decimals & Percents

Convert between fractions, decimals and percentages.

Check first: Equivalent fractions, decimal place value and percent meaning per hundred.

Level	Practice content	Example	Base time
A1.1	Halves, quarters, fifths, tenths	1/2 = ?%	8 s
A1.2	Eighths, twentieths; thirds to the nearest 1%	3/8 = ?%	7 s
A1.3	Back to a fraction; two fractions as a percentage	1/4 + 2/5 = ?%	6 s

A2 / Fractions & Percents

Calculate fractions and percentages of amounts.

Check first: Multiplication and division facts; the meaning of a fraction of an amount.

Level	Practice content	Example	Base time
A2.1	Simple fractions and 10%	1/4 of 48	9 s
A2.2	Thirds, fifths, eighths; 25% and 75%	25% of 88	8 s
A2.3	Fractions of amounts; percentages in steps of 5% from 10% to 80%	35% of 80	7 s

A3 / Percentage Increase & Decrease

Calculate amounts after a percentage increase or decrease.

Check first: Percentages of amounts and the starting amount in each change.

Level	Practice content	Example	Base time
A3.1	By 10% or 50%	Increase 60 by 10%	10 s
A3.2	By 20%, 25%, 75%	Increase 80 by 25%	9 s
A3.3	Two successive changes; changes by 15%	Increase 240 by 15%	8 s

12 / APPLIED FLUENCY

Signed numbers, expressions and ratio

Base times are reference settings. Some forms have a different allowance; use the target shown for the question. See page 16.

A4 / Integer Operations

Calculate with positive and negative integers.

Check first: A number line, signed-number rules and order of operations.

Level	Practice content	Example	Base time
A4.1	Adding and subtracting across zero	−7 + 3	8 s
A4.2	× and ÷, brackets and squares	(−5) × (−4)	7 s
A4.3	Three terms, order of operations	(−2) × 8 + 10	8 s

A5 / Multi-Step Calculations

Evaluate expressions containing several operations.

Check first: The four operations, brackets and order of operations; powers for later forms.

Level	Practice content	Example	Base time
A5.1	Two-step addition and subtraction	8 + 7 − 5	7 s
A5.2	Mixed operations using the correct order	4 + 6 × 2	9 s
A5.3	Brackets and squares	(9 + 4) × 7	9 s

A6 / Ratio & Proportional Reasoning

Simplify, scale and share quantities using ratios.

Check first: Multiplication, division, common factors and the meaning of a ratio.

Level	Practice content	Example	Base time
A6.1	Simplify a ratio; scale it	Write 8 : 12 in simplest form	10 s
A6.2	Sharing in a ratio, scaling	Share 35 in the ratio 2 : 3	9 s
A6.3	The unknown first; scaling	? : 72 = 5 : 9	8 s

13 / APPLIED FLUENCY

Fraction and decimal arithmetic

Base times are reference settings. Some forms have a different allowance; use the target shown for the question. See page 16.

A7 / Fraction Arithmetic

Calculate with fractions using manageable number combinations.

Check first: Equivalent fractions, common denominators and fraction operation rules.

Level	Practice content	Example	Base time
A7.1	Same denominator; unit fractions	5/8 – 2/8	6.5 s
A7.2	Related denominators; one simplification step	1/3 + 5/6	8 s
A7.3	Manageable denominators; simplification across both fractions	3/4 ÷ 3/8	10 s

A8 / Decimal Arithmetic

Compare decimals and calculate with decimal amounts.

Check first: Decimal place value and the meaning of multiplication and division.

Level	Practice content	Example	Base time
A8.1	A tenth × a digit; which is larger	0.3 × 4	6 s
A8.2	Complements to one; a decimal ÷ a digit	1 – 0.35	6 s
A8.3	Tenths × tenths; dividing by a tenth	3 ÷ 0.5	6 s

Check the meaning as well as the calculation

Ask learners to explain a fraction or decimal using a diagram, quantity or number line outside timed practice. A correct calculation does not by itself show that they can interpret the result in a new situation.

14 / CURRICULUM CONNECTIONS

Locate related content

These are editorial cross-references to selected topics, not certification that a national standard has been met.

England means the National Curriculum in England, not a single UK-wide curriculum. Common Core references identify US standards used by participating jurisdictions. Local requirements still need checking.

Skill	England: related content	Common Core: related codes	Scope of the connection
F1	Y1-2: addition	2.OA.B.2	Three-term sums extend beyond the two-number memory clause.
F2	Y1-2: subtraction	2.OA.B.2	The US memory clause concerns addition; subtraction fluency is related.
F3	Y2-4: times tables	3.OA.C.7	The 11 and 12 tables extend beyond the US one-digit memory clause.
F4	Y3-4: division facts	3.OA.C.7	Division facts up to 144 extend beyond the US within-100 scope.
F5	Y2-3: addition/subtraction	2.NBT.B.5, 3.NBT.A.2	Related number work; not a separate timed bonds standard.
M1	Y5: place value	5.NBT.A.2	Selected calculations; explanation and wider powers are not established.
M2	Y2-4: mental methods	3.OA.B.5	A strategy connection; decimal halving is not specified by this code.
M3	Y2-3: mental addition	2.NBT.B.5, 3.NBT.A.2	Selected strategies within broader arithmetic expectations.
M4	Y2-3: mental arithmetic	2.NBT.B.5, 3.NBT.A.2	Mental forms only; broader ranges and methods are also required.
M5	Y3-4: mental multiplication	3.OA.B.5	Operation properties support the methods; named shortcuts are Numina choices.
M6	Y3-4: multiplication	4.NBT.B.5	Two-digit by one-digit is a subset; models and explanations remain separate.
M7	Y4: mental division	4.NBT.B.6	Selected methods; several Numina divisors exceed this code's one-digit scope.
M8	Y4-5: estimation	4.NBT.A.3, 3.OA.D.8	Calculation estimates do not cover full word-problem reasoning.
M9	Y5 / KS3: powers, roots	8.EE.A.2	Value practice; not the full equation-solving expectation.

Read every row as a partial connection. National expectations can also require explanation, modelling, contextual problems, written methods and wider number ranges. A Numina level does not establish all of those.

15 / CURRICULUM CONNECTIONS

Keep the limits visible

Selected arithmetic content, not a complete year or course.

Skill	England: related content	Common Core: related codes	Scope of the connection
M10	Y5-6: factors, multiples	4.OA.B.4, 6.NS.B.4	Selected number tasks; wider reasoning still needs checking.
M11	Y5-6: equivalent fractions	4.NF.A.1	Simplifying uses equivalence; this code also expects explanation with models.
M12	Y6 / KS3: number comparison	6.NS.C.7	Comparison is related; product digit-count tasks are Numina extensions.
M13	Y6 / KS3: sequences	4.OA.C.5	Pattern work is related; this code is not a complete match for all later forms.
M14	Y4-6 / KS3: rounding	4.NBT.A.3, 5.NBT.A.4	Whole-number and decimal rounding overlap; significant figures go further.
A1	Y6: fraction/decimal/percent	4.NF.C.6, 6.RP.A.3c	Selected conversions; the complete standards require more.
A2	Y5-6: fractions, percentages	5.NF.B.4, 6.RP.A.3c	Calculation practice; contextual problems and models remain separate.
A3	KS3: percentage change	7.RP.A.3	Selected increase/decrease forms, not every percent problem.
A4	KS3: signed arithmetic	7.NS.A.1, 7.NS.A.2	Integers only; the standards extend to other rational numbers.
A5	Y6 / KS3: operation order	5.OA.A.1, 6.EE.A.2c	Numeric expressions; broader algebraic work is outside these tasks.
A6	Y6 / KS3: ratio	6.RP.A.3, 7.RP.A.2	Selected ratio forms; no claim of full rate, graph or proportion coverage.
A7	Y3-6 / KS3: fractions	4.NF.B.3, 5.NF.A.1, 5.NF.B.4, 6.NS.A.1	Mental forms only; fraction-by-fraction division extends beyond England Y6.
A8	Y4-6 / KS3: decimals	4.NF.C.7, 5.NBT.B.7, 6.NS.B.3	Selected decimal forms; not the complete range or written algorithms.

Department for Education: mathematics programmes of study. England year/key-stage references are topic locators. Each Common Core code above links to its official domain page. Sources checked 17 October 2026; the relationships shown here are Numina's editorial interpretation.

16 / USING THE LEVELS

Read progress in context

The level requirements are Numina's product rules. They are not national curriculum thresholds or validated measures of overall ability.

Requirement	How it is used
Qualifying answers	40 correct answers within the applicable time target at the current level.
Recent accuracy	At least 17 of the latest 20 attempted answers correct (85%). Two-choice Beginner exercises require 18 of 20 (90%).
Recent pace	At least 14 of the latest 20 attempts with valid timing correct and within time.
Advanced achievement	10 eligible answers must also meet the faster-answer threshold. These count within the qualifying total; they are not extra answers.

All applicable requirements work together when eligible practice is saved and marked. A qualifying placement boost reduces the count to 20 for 14 days; the other requirements still apply. The app shows the learner's actual target. Accuracy and pace use separate windows: interrupted attempts can count for accuracy but are excluded from pace.

What a base time means

The tables give the reference time for each level in seconds. A question form can have an extra allowance or a minimum time. Advanced faster-answer thresholds are separate from these base times.

What Mastered means

Mastered records the Advanced achievement in Numina. It remains earned; its promotion windows stop updating. Use later attempts and checks to assess current performance and retention.

What timing includes

In ordinary practice, timing runs from the displayed question being ready for input until submission. Reading, thinking and entering the answer are included. Loading and subsequent feedback are outside this interval.

Use the companion paper

The Maths Fluency white paper explains the research, practice design and limits of the records. Use this syllabus to select content, and teaching evidence to judge wider understanding.

About this edition

Prepared from the shared 27-skill, 81-level practice specification checked on 17 October 2026; timing-window wording corrected against application source on 18 October. Skill names, level codes, sample forms and base times identify the app's content. "Check first" notes and practice routes are editorial guidance, not extra app gates. This guide reports no independent validation of its sequence or time thresholds.