Mathematics progression skills with reasoning - Power Maths

Year 1

Number: Number and Place Value with Reasoning

COUNTING
Year 1
count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number Autumn: Units 1 and 6 Spring Unit 9 Summer: Unit 16
count, read and write numbers to 100 in numerals; count in multiples of twos, fives and tens Autumn: Unit: 1 Spring: Unit 9 Summer: Units 12, 16 18
given a number, identify one more and one less Autumn: Units 1 and 6 Spring: Unit: 9 Summer: Unit 16
Spot the mistake: 5,6,8,9 What is wrong with this sequence of numbers? **True or False?**

I start at 2 and count in twos. I will say 9

What comes next?
10+1 = 11
11+1= 12
12+1 = 13
……..

COMPARING NUMBERS

use the language of: equal to, more than, less than (fewer), most, least

Autumn: Units 1 and 6
Spring: Unit: 9
Summer: Unit 16

Do, then explain
Look at the objects. (in a collection). Are there more of one type than another?
How can you find out?

IDENTIFYING, REPRESENTING AND ESTIMATING NUMBERS

identify and represent numbers using objects and pictorial representations including the number line

Autumn: Units 1 and 6
Spring: Unit: 9
Summer: Unit 16

READING AND WRITING NUMBERS (including Roman Numerals

read and write numbers from 1 to 20 in numerals and words.

Autumn: Units 1 and 6

UNDERSTANDING PLACE VALUE

Daily Number sense

Number: Addition and Subtraction with Reasoning

NUMBER BONDS

Year 1

represent and use number bonds and related subtraction facts within 20

Autumn: Units 2, 3 and 4

Spring: Units: 7 and 8

Continue the pattern
10 + 8 = 18
11 + 7 = 18
Can you make up a similar pattern for the number 17?
How would this pattern look if it included subtraction?

Missing numbers
9 + ☐ = 10
10 - ☐ = 9

What number goes in the missing box?

MENTAL CALCULATION

add and subtract one-digit and two-digit numbers to 20, including zero

Autumn: Unit: 4,
Spring: Unit: 7 and 8

Working backwards
Through practical games on number tracks and lines ask questions such as “where have you landed?” and “what numbers would you need to throw to land on other given numbers?”
What do you notice?
11 – 1 = 10
11 – 10 = 1
Can you make up some other number sentences like this involving 3 different numbers?

read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs
(appears also in Written Methods)

Autumn: Units 2, 3 and 4
Spring: Unit: 8

Fact families
Which four number sentences link these numbers? 12, 15, 3

What else do you know?
If you know this:
12 – 9 = 3
what other facts do you know?

Missing symbols
Write the missing symbols (+ - =) in these number sentences:
17 ☐ 3 ☐ 20

18 ☐ 20 ☐ 2

WRITTEN METHODS

read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs
(appears also in Mental Calculation)

Autumn: Units 2, 3 and 4
Spring: Unit: 8

Convince me
In my head I have two odd numbers with a difference of 2. What could they be?
Convince me

Missing numbers
Fill in the missing numbers (using a range of practical resources to support)
12 + ☐ = 19
20 - ☐ = 3

INVERSE OPERATIONS, ESTIMATING AND CHECKING ANSWERS

Making an estimate

Pick (from a selection of number sentences) the ones where the answer is 8 or 9.

Is it true that?

Is it true that 3+4 = 4 + 3?

PROBLEM SOLVING

solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as 7 = □ - 9

Autumn: Units 3 and 4

Spring: Units: 7, 8, 9, 10 and 11

Summer: Units: 12, 13 and 17

Number: Multiplication and Division with Reasoning

MULTIPLICATION & DIVISION FACTS

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
count in multiples of twos, fives and tens (copied from Number and Place Value) Autumn: Unit 1					

MENTAL CALCULATION

Daily Number Sense skills

Making links If one teddy has two apples, how many apples will three teddies have? Here are 10 lego people If 2 people fit into the train carriage, how many carriages do we need?					

WRITTEN CALCULATION

Continue to use pictorial representations and stem sentences to develop, embed and deepen children's understanding of 'making links' above.

Practical
If we put two pencils in each pencil pot how many pencils will we need?

PROPERTIES OF NUMBERS: MULTIPLES, FACTORS, PRIMES, SQUARE AND CUBE NUMBERS

Spot the mistake
Use a puppet to count but make some deliberate mistakes.

e.g. 2 4 5 6
10 9 8 6
See if the pupils can spot the deliberate mistake and correct the puppet

ORDER OF OPERATIONS

This objective is 'met' in year 6.

INVERSE OPERATIONS, ESTIMATING AND CHECKING ANSWERS

Use ideas in 'properties of numbers' to develop this. Children are not introduced to the 'X' and ÷ until year 2.

PROBLEM SOLVING

solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher

Summer: Units 12 and 13

Number: Fractions (including Decimals and Percentages) Reasoning

Year 1

COUNTING IN FRACTIONAL STEPS

Not covered in Year 1

RECOGNISING FRACTIONS

recognise, find and name a half as one of two equal parts of an object, shape or quantity

Summer: Unit 14

What do you notice?

Choose a number of counters. Place them onto 2 plates so that there is the same number on each half.
When can you do this and when can't you?

recognise, find and name a quarter as one of four equal parts of an object, shape or quantity

Summer: Unit 14

True or false?
Sharing 8 apples between 4 children means each child has 1 apple.

COMPARING FRACTIONS

Not covered in Keystage 1

COMPARING DECIMALS

Not covered in Keystage 1

ROUNDING INCLUDING DECIMALS

Not covered in Keystage 1

EQUIVALENCE (INCLUDING FRACTIONS, DECIMALS AND PERCENTAGES)

Not covered in Year 1

ADDITION AND SUBTRACTION OF FRACTIONS

Not covered Keystage 1

MULTIPLICATION AND DIVISION OF FRACTIONS

Not covered in Keystage 1

MULTIPLICATION AND DIVISION OF DECIMALS

Not covered in Keystage 1

Number: Ratio and Proportion with Reasoning

Statements only appear in Year 6 but should be connected to previous learning, particularly fractions and multiplication and division

Number: Algebra with Reasoning

Year 1

EQUATIONS

solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and ***missing number problems*** *such as* *7 = □ - 9*
(copied from Addition and Subtraction)

Autumn: Units 3 and 4
Spring: Units 7, 8, 9 and 10
Summer: Unit 17

represent and use number bonds and related subtraction facts within 20 (copied from Addition and Subtraction)

Autumn: Units 2, 3 and 4
Spring: Units 7, 8
Summer: Unit 16

Connected Calculations

11 = 3 + 8
12 = 4 + 8
13 = ☐ + 8
14 = ☐ + 8

What numbers go in the boxes?
Can you continue this sequence of calculations?

FORMULAE

Not covered in Keystage 1

SEQUENCES

sequence events in chronological order using language such as: before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening
(copied from Measurement)

Summer: Unit 17

Measurement with Reasoning

Year 1

COMPARING AND ESTIMATING

compare, describe and solve practical problems for:

* lengths and heights [e.g. long/short, longer/shorter, tall/short, double/half]
* mass/weight [e.g. heavy/light, heavier than, lighter than]
* capacity and volume [e.g. full/empty, more than, less than, half, half full, quarter]
* time [e.g. quicker, slower, earlier, later]

Spring: Units 10 and 11
Summer: Unit 17

Top tips
How do you know that this (object) is heavier / longer / taller than this one?
Explain how you know.

sequence events in chronological order using language [e.g. before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening]
Summer: Unit 17

Explain thinking
Ask pupils to reason and make statements about to the order of daily routines in school e.g. daily timetable
e.g. we go to PE **after** we go to lunch. Is this true or false?

What do we do before break time? etc.

MEASURING and CALCULATING

measure and begin to record the following:

* **lengths and heights**
* **mass/weight**
* **capacity and volume**
* **time** (hours, minutes, seconds**)**

Spring: Units 10 and 11
Summer: Unit 17

Application
(Can be practical)
Which two pieces of string are the same length as this book?

recognise and know the value of different denominations of **coins and notes**

Summer: Unit 18

Possibilities

Ella has two silver coins.
How much money might she have?

TELLING THE TIME

tell the time to the hour and half past the hour and draw the hands on a clock face to show these times.

Summer: Unit 17

recognise and use language relating to dates, including days of the week, weeks, months and years

Summer: Unit 17

CONVERTING

Not covered in Year 1

Geometry: Properties of Shapes with Reasoning

Year 1

IDENTIFYING SHAPES AND THIER PROPERTIES

recognise and name common 2-D and 3-D shapes, including:

* 2-D shapes [e.g. rectangles (including squares), circles and triangles]
* 3-D shapes [e.g. cuboids (including cubes), pyramids and spheres].

Autumn: Unit 5

What's the same, what's different?
Find a rectangle and a triangle in this set of shapes. Tell me one thing that's the same about them. Tell me one thing that is different about them.

Visualising
Put some shapes in a bag.
Find me a shape that has more than three edges.

DRAWING AND CONSTRUCTING

Continuous provision to encourage exploration.

COMPARING AND CLASSIFYING

True or false?

All 2-D shapes have at least 4 sides

Other possibilities
Can you find shapes that can go with the set with this label?

Year 1

POSITION, DIRECTION AND MOVEMENT

describe position, direction and movement, including half, quarter and three-quarter turns.

Summer: Unit 15

Working backwards

The shape below was turned three quarter of a full turn and ended up looking like this.

What did it look like when it started? (practical)

"Have straight sides"

ANGLES

Not covered in Year 1

Geometry: Position and Direction with Reasoning

PATTERN

Continuous provision to encourage exploration.

Statistics with Reasoning

Children are introduced to this strand in Year 2. However, clever attention could be drawn to the use of house points.