Mathematics progression skills with reasoning – Power Maths

Year 2

Number: Number and Place Value with Reasoning

COUNTING
Year 2
count in steps of 2, 3, and 5 from 0, and in tens from any number, forward or backward Autumn: Units 1 and 2 Spring Unit 9 Summer: Unit 12
Spot the mistake: 45,40,35,25 What is wrong with this sequence of numbers? **True or False?** I start at 3 and count in threes. I will say 13? **What comes next?** 41+5=46 46+5=51 51+5=56 ……
COMPARING NUMBERS
compare and order numbers from 0 up to 100; use <, > and = signs Autumn: Unit 1

Do, then explain
37 13 73 33 3
If you wrote these numbers in order starting with the smallest, which number would be third?
Explain how you ordered the numbers.

IDENTIFYING, REPRESENTING AND ESTIMATING NUMBERS

identify, represent and estimate numbers using different representations, including the number line

Autumn: Unit 1

READING AND WRITING NUMBERS (including Roman Numerals

read and write numbers to at least 100 in numerals and in words

Autumn: Unit 1

UNDERSTANDING PLACE VALUE

recognise the place value of each digit in a two-digit number (tens, ones)

Autumn: Unit 1

Do, then explain
Show the value of the digit 2 in these numbers?
32 27 92
Explain how you know.

Make up an example
Create numbers where the units digit is one less than the tens digit. What is the largest/smallest number?

ROUNDING

Not covered in Keystage 1

PROBLEM SOLVING

use place value and number facts to solve problems

Summer: Unit 12

Number: Addition and Subtraction with Reasoning

NUMBER BONDS

Year 2

recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100

Autumn: Unit 2

Continue the pattern

90 = 100 – 10

80 = 100 – 20

Can you make up a similar pattern starting with the numbers 74, 26 and 100?

Missing numbers

91 + ☐ = 100

100 - ☐ = 89

What number goes in the missing box?

MENTAL CALCULATION

add and subtract numbers using concrete objects, pictorial representations, and mentally, including:

* a two-digit number and ones
* a two-digit number and tens
* two two-digit numbers
* adding three one-digit numbers

Autumn: Units: 2, 3

Summer: Unit 12

True or false?

Are these number sentences true or false?73 + 40 = 113

98 – 18 = 70

46 + 77 = 123

92 – 67 = 35

Give your reasons.

Hard and easy questions

Which questions are easy / hard?

23 + 10 =

93 + 10 =

54 + 9 =

54 + 1 =

Explain why you think the hard questions are hard?

Other possibilities

□ + □ + □ = 14

What single digit numbers could go in the boxes? How many different ways can you do this?

show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot

Autumn: Unit 2

Summer: Unit 12

Fact families

Which four number sentences link these numbers?

100, 67, 33

What else do you know?
If you know this:
87 = 100 – 13
what other facts do you know?

Missing symbols
Write the missing symbols (+ - =) in these number sentences:
80 ☐ 20 ☐ 100

100 ☐ 70 ☐ 30

87 ☐ 13 ☐ 100

WRITTEN METHODS

Convince me
What digits could go in the boxes?
7 ☐ - 2 ☐ = 46
Try to find all of the possible answers.
How do you know you have got them all?
Convince me

INVERSE OPERATIONS, ESTIMATING AND CHECKING ANSWERS

recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.

Summer: Unit 12

Making an estimate
Which of these number sentences have the answer that is between 50 and 60
74 - 13 55 + 17 87 – 34

Always, sometimes, never

Is it always, sometimes or never true that if you add three numbers less than 10 the answer will be an odd number

PROBLEM SOLVING

solve problems with addition and subtraction:

* using concrete objects and pictorial representations, including those involving numbers, quantities and measures
* applying their increasing knowledge of mental and written methods

Autumn: Units 2, 3 and 4

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

Summer: Units: 12, 13 and 17

solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change (copied from Measurement)

Autumn: Unit 4

Number: Multiplication and Division with Reasoning

MULTIPLICATION & DIVISION FACTS

Year 2

count in steps of 2, 3, and 5 from 0, and in tens from any number, forward or backward
(copied from Number and Place Value)

Autumn: Units 1 and 2

recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers

Autumn: Units 5 and 6

Missing numbers
10 = 5 x ☐
What number could be written in the box?

Making links
I have 30p in my pocket in 5p coins. How many coins do I have?

MENTAL CALCULATION

Daily Number Sense skills and KIRFs

show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot

Summer: Unit 12

Making links

Write the multiplication number sentences to describe this array

X	X	X
X	X	X

What do you notice?
Write the division sentences.

WRITTEN CALCULATION

calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs

Autumn: Unit 5
Spring: Unit 6
Summer: Unit 12

Prove It
Which four number sentences link these numbers? 3, 5, 15?
Prove it.

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

True or false?

When you count up in tens starting at 5 there will always be 5 units.

ORDER OF OPERATIONS

This objective is 'met' in year 6.

INVERSE OPERATIONS, ESTIMATING AND CHECKING ANSWERS

Use the inverse
Use the inverse to check if the following calculations are correct:
12 ÷ 3 = 4
3 x 5 = 14

PROBLEM SOLVING

solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts

Autumn: Unit 5
Spring: Unit 6
Summer: Unit 12

Number: Fractions (including Decimals and Percentages) Reasoning

Year 2

COUNTING IN FRACTIONAL STEPS

Pupils should count in fractions up to 10, starting from any number and using the1/2 and 2/4 equivalence on the number line (Non Statutory Guidance)

Spring: Unit 10

Spot the mistake
7, 7 ½ , 8, 9, 10
8 ½, 8, 7, 6 ½,
… and correct it

What comes next?
5 ½, 6 ½ , 7 ½ , …., ….
9 ½, 9, 8 ½, ……, …..

RECOGNISING FRACTIONS

recognise, find, name and write fractions $^{1}/_{3}$, $^{1}/_{4}$, $^{2}/_{4}$ and $^{3}/_{4}$ of a length, shape, set of objects or quantity

Spring: Unit 10

What do you notice?

¼ of 4 = 1
¼ of 8 = 2
¼ of 12 = 3
Continue the pattern
What do you notice?

True or false?
Half of 20cm = 5cm
¾ of 12cm = 9cm

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)

write simple fractions e.g. $^{1}/_{2}$ of 6 = 3 and recognise the equivalence of $^{2}/_{4}$ and $^{1}/_{2}$.

Spring: Unit 11

Odd one out.
Which is the odd one out in this trio:
½ 2/4 ¼
Why?

What do you notice?

Find ½ of 8.
Find 2/4 of 8
What do you notice?

Ordering

Put these fractions in the correct order, starting with the smallest.
½ ¼ 1/3

ADDITION AND SUBTRACTION OF FRACTIONS
Not covered in 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 2

EQUATIONS

recognise and use the inverse relationship between addition and subtraction and use this to check calculations and ***missing number*** *problems.*
(copied from Addition and Subtraction)

Summer: Unit 12

recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100
(copied from Addition and Subtraction)

Autumn: Unit 2

Connected Calculations

Put the numbers 19, 15 and 4 in the boxes to make the number sentences correct.

□ = □ - □

□ = □ + □

FORMULAE

Not covered in Keystage 1

SEQUENCES

compare and sequence intervals of time
(copied from Measurement)

Summer: Unit 13

Summer: Unit 11

order and arrange combinations of mathematical objects in patterns
(copied from Geometry: position and direction)

Spring: Unit 9

Summer: Unit 11

True or false?
Explain
The largest three digit number that can be made from the digits 2, 4 and 6 is 264. Is this true or false? Explain your thinking.

Measurement with Reasoning

Year 2

COMPARING AND ESTIMATING

compare and order lengths, mass, volume/capacity and record the results using >, < and =

Spring: Unit 8

Summer: Unit 14

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Top tips
Put these measurements in order starting with the smallest.
75 grammes
85 grammes
100 grammes
Explain your thinking

Position the symbols
Place the correct symbol between the measurements > or <
36cm ☐ 63cm

130ml ☐ 103ml
Explain your thinking

compare and sequence intervals of time

Summer: Unit 13

Undoing

The film finishes two hours after it starts. It finishes at 4.30. What time did it start?
Draw the clock at the start and the finish of the film.

Explain thinking

The time is 3:15pm.
Kate says that in two hours she will be at her football game which starts at 4:15.
Is Kate right? Explain why.

MEASURING and CALCULATING

choose and use appropriate standard units to estimate and measure **length/height** in any direction (m/cm); **mass** (kg/g); **temperature** (°C); **capacity** (litres/ml) to the nearest appropriate unit, using rulers, scales, thermometers and measuring vessels

Spring: Unit 8
Summer: Unit 14

Application

(Practical)
Draw two lines whose lengths differ by 4cm.

recognise and use symbols for pounds **(£) and pence (p)**; combine amounts to make a particular value Autumn: Unit 4	find different combinations of coins that equal the same amounts of money Autumn: Unit 4	**solve simple problems** in a practical context involving addition and subtraction of money of the same unit, including giving change Autumn: Unit 4

Possibilities

How many different ways can you make 63p using only 20p, 10p and 1p coins?

TELLING THE TIME

tell and write the time to five minutes, including quarter past/to the hour and draw the hands on a clock face to show these times.
Summer: Unit 13

know the number of minutes in an hour and the number of hours in a day.
(appears also in Converting)
Summer: Unit 13

Working backwards

Draw hands on the clock faces to show when break started and when it finished 15 minutes later at 10:35.

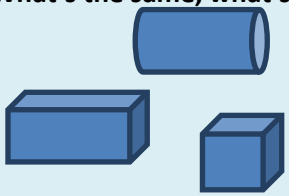
CONVERTING

know the number of minutes in an hour and the number of hours in a day. (appears also in Telling the Time) Summer: Unit 13
The answer is …. 3 hours What is the question? **What do you notice?** What do you notice? 1 hour = 60 minutes ½ hour = 30 minutes ¼ hour = 15 minutes Write down some more time facts like these

Geometry: Properties of Shapes with Reasoning

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
IDENTIFYING SHAPES AND THIER PROPERTIES					
identify and describe the properties of 2-D shapes, including the number of sides and line symmetry in a vertical line Spring: Unit 9		identify and describe the properties of 3-D shapes, including the number of edges, vertices and faces Spring: Unit 9		identify 2-D shapes on the surface of 3-D shapes, [for example, a circle on a cylinder and a triangle on a pyramid] Spring: Unit 9	

What's the same, what's different? Pick up and look at these 3-D shapes.



Do they all have straight edges and flat faces?
What is the same and what is different about these shapes?

Visualising
In your head picture a rectangle that is twice as long as it is wide.
What could its measurements be?

DRAWING AND CONSTRUCTING

Continuous provision to encourage exploration.

COMPARING AND CLASSIFYING

compare and sort common 2-D and 3-D shapes and everyday objects

Spring: Unit 9

Always, sometimes, never
Is it always, sometimes or nerver true that when you fold a square in half you get a rectangle.

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

"Have straight sides and all sides are the same length"

ANGLES

identify and describe the properties of 2-D shapes, including the number of sides and line symmetry in a vertical line

Spring: Unit 9

Geometry: Position and Direction with Reasoning

Year 2

POSITION, DIRECTION AND MOVEMENT

use mathematical vocabulary to describe position, direction and movement including movement in a straight line and distinguishing between rotation as a turn and in terms of right angles for quarter, half and three-quarter turns (clockwise and anti-clockwise)

Summer: Unit 11

Working backwards

If I face forwards and turn three quarter turns clockwise then a quarter turn anti-clockwise describe my finishing position.

PATTERN

order and arrange combinations of mathematical objects in patterns and sequences

Spring: Unit 9

Summer: Unit 11

What comes next?

Explain why

Statistics with Reasoning

Year 2

INTERPRETING, CONSTRUCTING AND PRESENTING DATA

interpret and construct simple pictograms, tally charts, block diagrams and simple tables

Spring: Unit 7
ask and answer simple questions by counting the number of objects in each category and sorting the categories by quantity
Spring: Unit 7
ask and answer questions about totalling and comparing categorical data
Spring: Unit 7
True or false? (Looking at a simple pictogram) “More people travel to work in a car than on a bicycle”. **Is this true or false?** **Convince me.** Make up you own ‘true/false’ statement about the pictogram **What’s the same, what’s different?** Pupils identify similarities and differences between different representations and explain them to each other
SOLVING PROBLEMS
Create a questions Pupils ask (and answer) questions about different statistical representations using key vocabulary relevant to the objectives.