Second Level – Exploring Number

Whole Number Homework Cards

WN2.1 I can use my knowledge of place value to count, read, write, partition and order numbers

House prices *newspapers, computer with internet access* Ask children to find different house prices from adverts in the local paper or the internet. They list up to ten prices in their Learning Logs. They underline one digit of each house price and identify the value of it using words or figures, e.g. £984 000 is eighty thousand pounds or £80 000; £175 000 is five thousand pounds or £5000.

WN2.1 I can use my knowledge of place value to count, read, write, partition and order numbers

Space hopping Ask children to research the distance from the Earth to the Moon and other planets, e.g. it is about 384 403 km to the Moon. Children record their information in digits and in words (three hundred and eighty-four thousand, four hundred and three kilometres) and write the distances in order.

WN2.2 I can recall my number bonds quickly and accurately and can use multiples of 10 and 100 to create new facts

Quick grids Ask children to draw some 3×3 grids. In the top left they draw a + sign. In the other two spaces in the top row and in the left column they write 2- or 3-digit multiples of 10 (or alternatively 3- or 4-digit multiples of 100). Finally, they fill in the remaining four spaces with the totals, e.g.

+	50	170
80	130	250
140	190	310

WN2.2 I can recall my number bonds quickly and accurately and can use multiples of 10 and 100 to create new facts

Write a guide Ask children to write a short guide to help younger children to understand how to find totals and differences of multiples of 10 and 100 using facts already known, e.g. how to work out 150 – 80, 700 + 1600 or 2500 – 1800.

WN2.3 I can recall my table facts quickly and accurately and can use multiples of 10 and 100 to create new facts

The answer is 2400 Ask children to write as many multiplication questions as they can involving multiples of 10 and 100 with the answer 2400, e.g. 3 × 800, 40 × 60, 12 × 200, 80 × 30, 120 × 20, 400 × 6, etc, if appropriate. Encourage children to include more than two numbers in the multiplication questions, e.g. 3 × 40 × 20 or 2 × 20 × 60 or 2 × 2 × 2 × 300, etc. Other target numbers could be given, e.g. 360, 4800 or 6400, etc.

WN2.3 I can recall my table facts quickly and accurately and can use multiples of 10 and 100 to create new facts

Teach them how Ask children to write two short explanations in their learning logs for children of a younger age. These should explain how times-tables facts are related to multiplying multiples of 10 or 100 such as 90 × 60, 3 × 80, 7 × 700, 800 × 600, etc. and how tables can be used to help answer such questions.

WN2.4 I can work with the four operations using a variety of strategies to solve calculations

Funny puzzles Introduce the idea of calculation puzzles made using numbers of things personal to the individual, e.g. What is the number of doors in your house, multiplied by your favourite number and then divided by your age? Ask children to make up and calculate answers to four different puzzles.

WN2.4 I can work with the four operations using a variety of strategies to solve calculations

Strategies Provide children with a set of four calculations appropriate to each child and similar to those used in the lesson. Ask each child to answer each question in two different ways, showing their working to demonstrate two different strategies for answering each.

WN2.5a I can use an extended range of numbers – Beyond 5 digits

House prices newspapers, computer with internet access Ask children to find different house prices from adverts in the local paper or the internet. They list up to ten prices in their learning logs. They underline one digit of each house price and identify the value of the underlined digit using words or figures, e.g. £984 000 is eighty thousand pounds or £80 000; £175 000 is five thousand pounds or £5000.

WN2.5a I can use an extended range of numbers – Beyond 5 digits

Digit shuffle Ask children to write the last six digits of a phone number (their own or a friend's) into their learning logs. For each number they write it in words and partition the digits like this: 387 249 is three hundred and eighty-seven thousand, two hundred and forty-nine. 387 249 = 387 000 + 249.

WN2.5b I can use an extended range of numbers – Negative numbers

Temperature chain puzzles Ask children to make a puzzle by writing a chain of temperature changes, e.g. It was 7°C and then it reached 10°C. The temperature then rose by 5° before dropping a further 8°. What is the temperature now? They give the initial temperature and make sure they know the final temperature in each puzzle. Use the puzzles in another lesson as a class quiz.

WN2.5b I can use an extended range of numbers – Negative numbers

Negative news Ask children to find three examples of negative numbers in newspaper articles. Examples could include weather reports, movements down league ladders (e.g. football ladders or music charts). They write a sentence explaining what each number means in that context.

WN2.6 I can explain and use the tests of divisibility

Is it possible? Provide puzzles such as those below for children to investigate and write an explanation justifying their reasoning:
- Is it possible to arrange the digits 4, 5 and 9 to make a 3-digit number that is divisible by 4?
- Is it possible to arrange the digits 3, 7 and 9 to make a 3-digit number that is divisible by 8?
- Is it possible to arrange the digits 2, 3 and 4 to make a 3-digit number that is NOT divisible by 9?

WN2.6 I can explain and use the tests of divisibility

Linking tests Ask children to write three rules that show the relationships between some of the tests of divisibility, e.g. 'If a number is divisible by 9 it will also be divisible by 3' or 'If a number is divisible by 3 and by 2 it will also be divisible by 6'. They should provide at least one example for each rule.

WN2.7 I can multiply and divide by 1000

Newspaper search *newspapers, magazines* Ask children to cut out multiples of 1000 from newspapers or magazines (e.g. house or car prices) and stick them into their learning logs. For each number they write a calculation (using × 10/100/1000 or ÷ 10/100/1000) involving that number, e.g. 564 × 1000 = 564 000 or 47 000 ÷ 1000 = 47.

WN2.7 I can multiply and divide by 1000

Kilometres to metres *map, SAT-NAV or computer with internet access* Ask children to find distances in kilometers between towns or cities (either direct distance or driving distance), from a map book, SAT-NAV or on the internet. They write the distances in kilometres and then convert them to metres (by multiplying by 1000), e.g. London to Edinburgh is 535 km = 535 000 m

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WN2.8 I can create a set of multiples and find common multiples between tables

Around the house Children make a list of five numbers they find around the house. They investigate the factors of each then in school compare their results with a partner.

WN2.8 I can create a set of multiples and find common multiples between tables

Money grabbing *coins (1p, 2p, 5p and 10p)* Ask children to collect a pile of small coins (about four 10p coins and some 1p, 2p and 5p coins). They grab some of the coins and write how much they grabbed, e.g. 38p. If this is a multiple of 2, 3, 4,
5, 6, 7, 8, 9 or 10 they score a point for each, e.g. 24p would score 5 points (it is a multiple of 2, 3, 4, 6 and 8), but 17p would score no points. They record their findings in their learning logs.

WN2.9 I can work out factor pairs and work out which numbers are prime

Football teams Investigate which players in your favourite football team wear prime numbers on their shirts.

WN2.9 I can work out factor pairs and work out which numbers are prime

Prime suspect Children choose a prime number between 30 and 100, e.g. 43, and write the two numbers either side of it, e.g. 42 and 44. They find the number of factors for the two adjacent numbers, e.g. 42 (eight factors) and 44 (six factors). Ask them to investigate if there is a prime number that lies between two numbers with the same number of factors. (There is only one solution for the prime 41.)

WN2.10 I can change the order of numbers in a calculation using brackets to show my thinking

Consecutive numbers Ask children to choose any 10 consecutive numbers between 20 and 100, e.g. 36, 37, 38, 39, 40, 41, 42, 43, 44, 45. They use reordering or grouping strategies to find the sum of the numbers and demonstrate their workings in their learning logs. An alternative set of consecutive numbers can be investigated in the same way and general patterns noted, e.g. the answer will always be a multiple of 5.

WN2.10 I can change the order of numbers in a calculation using brackets to show my thinking

Magic tricks *scrap paper or blank card* Children prepare some scraps of paper or card. They write a 2-digit number on one side and the complement to a chosen number (e.g. 100) on the other. They show them to an unsuspecting partner and say that they can read their mind and know what is on the reverse of the card.

Back in class children can use the cards to challenge each other. In this case they have to work out what the complement number is.

WN2.11 I can partition and re-order numbers in a calculation using brackets to show my thinking

Pick three Give children this list of numbers: 15, 18, 2, 25, 6, 35, 14, 80. Ask them to pick sets of three and find the products, using partitioning or reordering to help them, e.g. $14 \times 15 \times 2 = 7 \times 2 \times 5 \times 3 \times 2 = 7 \times 10 \times 6 = 42 \times 10 = 420$. They do this several times and show their working for each.

WN2.11 I can partition and re-order numbers in a calculation using brackets to show my thinking

Split step dice or 1–9 spinner Children write all the different 3-digit numbers that can be made with the digits 3, 5 and 8. They then roll a dice or spin a spinner (or choose any single-digit number) to multiply each of the 3-digit numbers by, using a partitioning method. They list all their answers in order of size.

WN2.12 I can use the rule for the order of operations in calculations

Brackets Ask children to write the numbers 2, 12, 6 and 3 in this order several times. They should write any signs they choose between the numbers (including brackets) and find as many different answers as they can, e.g. $2 \times (12 \div 6) \times 3 = 12$, $(2 \times 12) - (6 \times 3) = 6$, $(2 + 12) \div (6 \div 3) = 7$, etc.

WN2.12 I can use the rule for the order of operations in calculations

1 to 20 Ask children to make the numbers 1 to 20 using the digits 1, 2, 4 and 8 in any order with any signs (including brackets). All four numbers must be used in each calculation.

WN2.13 I can round a wide range of numbers to the nearest 10, 100 and 1000 and can use this to estimate

Research round Ask children to research a topic such as the weights of animals, the heights of skyscrapers or an alternative theme involving lengths, masses or capacities. Ask them to record the information in their learning logs and use rounding appropriately to estimate related facts, e.g. the mass of 29 elephants or the height of the Taipei Tower.

WN2.13 I can round a wide range of numbers to the nearest 10, 100 and 1000 and can use this to estimate

Number round up Ask children to find as many examples as they can of numbers being rounded up or down to make them easier to work with. They could find print examples in newspapers or magazines, or spoken examples, e.g. 'There's about 8 litres of paint left'. They draw, stick or write about them in a page for the learning log.

WN2.14 I can use my knowledge of number and number operations to check my answers are accurate

Inverses Ask children to write an addition, a subtraction, a multiplication and a division calculation using the digits 5, 6, 7, 8 and 9, e.g. 687 + 95, 987 – 64, 56 × 789 and 9876 ÷ 5. (Adjust the number of digits according to ability.) They work out the answer to each calculation, then check each answer using the inverse operation.

WN2.14 I can use my knowledge of number and number operations to check my answers are accurate

Odd and evens Ask children to write notes in their learning logs explaining what they know about adding, subtracting, multiplying or dividing odd and even numbers, e.g. a child might know that an odd number multiplied by an odd number will always be odd (O × O = O). Encourage them to record what they know with examples.

WN2.15a I can use a range of mental strategies for addition and subtraction for an extended range of numbers – Rounding and adjusting

Mix and match Ask children to copy these 2- and 3-digit numbers: 59, 31, 88, 269, 177, 368 and 406. Ask them to choose pairs of the numbers and find the totals or differences, rounding and adjusting as necessary. *Which pair of numbers has a total closest to 450? Which pair has a difference closest to 200?*

WN2.15a I can use a range of mental strategies for addition and subtraction for an extended range of numbers – Rounding and adjusting

Paper cut-outs *magazines and newspapers* Ask children to cut out 2- and 3-digit numbers from magazines and newspapers. They group them in pairs and stick them into their learning logs. Then they find the totals and differences of the numbers in each pair.

WN2.15b I can use a range of mental strategies for addition and subtraction for an extended range of numbers – Counting on and back

Darts Ask children to draw a simple dartboard by drawing a circle split into four or six sectors. In each sector they write a 2-digit number, e.g. 46, 58, 68 and 39. Ask children to investigate as many different possible totals as they can that can be scored with three darts on their board. They use counting on strategies to find totals.

WN2.15b I can use a range of mental strategies for addition and subtraction for an extended range of numbers – Counting on and back

Teach them how Ask children to write two short explanations in their learning logs for children of a younger age. These should explain how to use counting on and back strategies when answering addition and subtraction calculations.

WN2.15c I can use a range of mental strategies for addition and subtraction for an extended range of numbers – Complements to 1000

Make a kilogram *different food items* Ask children to find food labels showing the masses of different food items, e.g. 440 g, 375 g. Ask them to stick the labels in their learning logs and to work out how much more of each item would be needed to make 1 kg, i.e. 560 g, 625 g respectively.

WN2.15c I can use a range of mental strategies for addition and subtraction for an extended range of numbers – Complements to 1000

Pairs *small pieces of paper or card* Ask children to write at least six pairs of complements to 1000 on to small pieces of paper, e.g. 472 and 528. They shuffle them and then match them up again. A 'Pairs' game can be played where cards are placed face down, two cards turned over, and pairs kept if they match.

WN2.16 I can use doubles, near doubles and halves to help me in my calculations

Cross-number *squared paper* Ask children to make up their own small crossnumber puzzle where each clue given is a doubling or halving question, e.g. 1 across: What is double 59? Demonstrate how to number the puzzle and to provide across and down clues.

WN2.16 I can use doubles, near doubles and halves to help me in my calculations

Halving chains Ask children to take each of the following numbers and keep halving until a number ending in 5 is reached: 8000, 1280, 1040, 1240, 1440, 1360. *Which number has the longest chain? (1280) Which number has the shortest chain? (1240)*

WN2.17 I can work out and record addition and subtraction calculations using formal methods for any whole numbers

Letter puzzle Provide children with a puzzle where an addition or subtraction question and answer is shown in the formal calculation layout, but where some of the digits are replaced by letters, e.g.

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  A 7 8 9          or          D 0 3 D
+ B 5 A B                    – 2 4 D 9
  6 A B 1                      2 D 7 6
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WN2.17 I can work out and record addition and subtraction calculations using formal methods for any whole numbers

DIY digits Ask children to make three 3-digit numbers using the digits 1–9, e.g. 598, 217, 346. They find sums and differences between the numbers, using formal methods and record this in their learning log. Challenge children to make the largest/smallest possible answers and answers nearest to 400, 300 and 1000, etc.

WN2.18a I have extended my range of mental strategies for multiplication – Rounding and adjusting

Which is largest? Ask children to work out and discover which of the following four calculations has the largest answer. They should use an adjustment method, predict first and then use an appropriate method to perform each calculation.
17 × 8, 19 × 6, 21 × 4, 22 × 9

WN2.18a I have extended my range of mental strategies for multiplication – Rounding and adjusting

99, 100, 101 Ask children to write 10 different numbers between 50 and 100. They multiply each number by 10, then by 11 and 9 using rounding and adjusting, e.g. 74 × 10 = 740, 74 × 9 = 66, 74 × 11 = 814. Encourage children to write notes to explain how they worked out each answer so that someone else looking at their work could understand their approach.

WN2.18b I have extended my range of mental strategies for multiplication – Multiples of 10, 100 and 1000

Mix and match Ask children to write as many true multiplication and division statements as they can using the following cards: ×, ÷, =, 6, 7, 42, 60, 70, 420, 600, 700, 4200, 42 000 and 420 000.

WN2.18b I have extended my range of mental strategies for multiplication – Multiples of 10, 100 and 1000

Who wants to be a billionaire? Ask children to compose their own questions like those explored in the lesson involving multiples of 10, 100 and 1000 for a quiz, giving four possible answers for each question (including the correct answer). The questions can then be used in school as a class quiz.

WN2.19a I can work out and record my multiplication calculations in a variety of different ways – Grid method (2-digit × 1-digit and 3-digit × 1-digit

Choose your digits Ask children to choose a set of three (or four) different digits and arrange them to make six different 2- or 3- digit × 1-digit multiplication questions, e.g. 5, 6 and 7 (and 8) would make questions such as 56 × 7, 65 × 7, 75 × 6, etc (or 576 × 8, 768 × 5, 785 × 6, etc). They solve each question and find which has the largest solution.

WN2.19a I can work out and record my multiplication calculations in a variety of different ways – Grid method (2-digit × 1-digit and 3-digit × 1-digit)

How did you do it? Adults are unlikely to have been shown the grid method when they were at school. Children show adults at home how to use the grid method to solve a multiplication problem.

WN2.19b I can work out and record my multiplication calculations in a variety of different ways – Formal methods (2-digit × 1-digit and 3-digit × 1-digit)

Multiply at home Ask children to work out the following: *What is your favourite number, multiplied by your age, multiplied by the number of people in your house?* Children can then write their own multiplication puzzle multiplying together other things, e.g. the number of letters in their name or their shoe size.

WN2.19b I can work out and record my multiplication calculations in a variety of different ways – Formal methods (2-digit × 1-digit and 3-digit × 1-digit)

Which is largest? Ask children to work out and discover which of the following four calculations has the largest answer: 351 × 6, 225 × 9, 289 × 7 or 389 × 5.
They should predict first and then use either an expanded or a formal method to perform each calculation.

WN2.19c I can work out and record my multiplication calculations in a variety of different ways – Grid method and formal methods (2-digit × 2-digit and 3-digit × 2-digit)

Choose your digits Ask children to choose a set of four (or five) different digits and arrange them to make six different 2- or 3- digit × 2-digit multiplication questions, e.g. 4, 5, 6 and 7 (and 8) would make questions such as 56 × 47, 65 × 74, 75 × 46, etc (or 576 × 48, 764 × 85, 785 × 64, etc). They solve each question and find which has the largest solution.

WN2.19c I can work out and record my multiplication calculations in a variety of different ways – Grid method and formal methods (2-digit × 2-digit and 3-digit × 2-digit)

Teach them how Ask children to write a short explanation in their learning logs for children of a younger age. These should explain how to solve a multiplication question (of 2-or 3-digit numbers multiplied by a 2-digit number) using either the grid method or a formal method.

WN2.20a I can work out and record my division calculations in a variety of different ways – Chunking method (2-digit ÷ 1-digit)

Digit dilemmas Ask children to write all the 2-digit ÷ 1-digit questions that can be written using the digits 4, 6 and 7, e.g. 46 ÷ 7, 67 ÷ 4, etc. Ask children to work out which of the questions has the largest answer.

WN2.20a I can work out and record my division calculations in a variety of different ways – Chunking method (2-digit ÷ 1-digit)

What remains? Ask children to find which numbers between 60 and 90 have a remainder of 3 when divided by 6, 7 or 8. (Answers: 63, 66, 67, 69, 73, 75, 80, 81,83, 87)

WN2.20b I can work out and record my division calculations in a variety of different ways – Expanded method (2-digit ÷ 1-digit, 3-digit ÷ 1-digit, 2- and 3-digit ÷ multiple of 10)

Digit dilemmas Ask children to write all the 2-digit ÷ 1-digit questions that can be written using the digits 8, 3 and 6, e.g. 86 ÷ 3, 63 ÷ 8, etc. Ask children to work out which of the questions has the largest answer.

WN2.20b I can work out and record my division calculations in a variety of different ways – Expanded method (2-digit ÷ 1-digit, 3-digit ÷ 1-digit, 2- and 3-digit ÷ multiple of 10)

Two to ten Ask children to choose a 2-digit number between 50 and 100, e.g. 73 and divide it by all the numbers from 2 to 10, using whichever method they prefer.

WN2.20c I can work out and record my division calculations in a variety of different ways – Formal method (2-digit ÷ 1-digit and 3-digit ÷ 1-digit)

Digit dilemmas Ask children to write all six 3-digit ÷ 1-digit questions that can be written using the digits 4, 5, 6 and 7, e.g. 456 ÷ 7, 674 ÷ 5. Ask children to work out which of the questions has the largest answer. Could they find a larger one?

WN2.20c I can work out and record my division calculations in a variety of different ways – Formal method (2-digit ÷ 1-digit and 3-digit ÷ 1-digit)

What remains? Ask children to find which 3-digit numbers with three identical digits have a remainder of 5 when divided by 9. (Answers: 111, 444, 777)

WN2.20d I can work out and record my division calculations in a variety of different ways – Formal method using sharing (2-digit ÷ 1-digit and 3-digit ÷ 1-digit)

Digit dilemmas Ask children to write six 3-digit ÷ 1-digit questions that can be written using the digits 6, 7, 8 and 9, e.g. 678 ÷ 9, 879 ÷ 6, etc. Ask children to work out which of the questions has the largest answer.

WN2.20d I can work out and record my division calculations in a variety of different ways – Formal method using sharing (2-digit ÷ 1-digit and 3-digit ÷ 1-digit)

Divisions, divisions Ask children to choose a 3-digit number, e.g. 793 and divide it by each number from 3 to 9 using an appropriate method.

WN2.21 I can select and use the most appropriate strategy to solve a calculation

One calculation, many problems Provide each child with an appropriate calculation and ask them to write as many different word problems as they can that are related to this question. They write the answers to each problem, remembering to use appropriate units in their answers.

WN2.21 I can select and use the most appropriate strategy to solve a calculation

A, B or C Ask children to write five word problems and provide three possible answers, A, B and C, one of which must be correct. Children make a note of the correct answers. Use the questions for a quiz at school.
