**St Peter’s Church of England (Aided) Primary School**







**Progression of Skills in Mathematics**

At St Peter’s we aim to develop procedural fluency in maths through deep and meaningful conceptual understanding.

Maths is made fun and relevant and the children are encouraged to be independent thinkers, mathematical talkers and problem solvers.

The written strategies in this booklet are taught consistently alongside a range of mental strategies allowing children to identify the strategy ***they*** wish to use.

**Our Maths Vocabulary**

|  |  |
| --- | --- |
| ***Addition***SumTotalAddPlusIncreaseMoreAltogether | ***Subtraction***SubtractLessMinusFind the differenceDifference betweenFewerTake away |
| ***Multiplication***MultiplyTimesLots ofProductRepeated addition | ***Division***Divided byGroups ofShareShare equallyRemainder |

**Addition**

**Early Addition Skills**

Counting objects reliably

Adding one more

Combining two groups

 + =

 3 2 5

Understand that addition can be done in any order

4 + 6 = 10 6 + 4 =10

Know number bonds within 10



Record addition as a number sentence using symbols

Tom has 5 conkers. He finds 2 more in the park. How many conkers does he have now?

 Understand addition is the inverse of subtraction and derive related facts

8 + 2 = 10 10 – 2 = 8

Use the inverse to calculate unknown amounts

9 + = 10

**Addition on a Number Line**

(Labelled and unlabelled number lines)

Counting on in jumps of 1

7 + 3 = 10



Use partitioning when ***bridging*** a multiple of 10

8 + 5 = 13

 + 2 +3



To partition numbers and count on in tens and units

34 + 15 = 49

 + 10 + 5

34 44 49

136 + 112 = 248

 + 100 +10 +2

136 236 246 248

Use partitioning to add decimal numbers

17.8 + 12.4 = 30.2

 + 10 + 2 +0.4

17.8 27.8 29.8 30.2

**Partitioning and Re-combining**

34 + 15 = (30 + 10) + (4 + 5)

 40 + 9 = 49

Extend to decimals

24.6 + 13.5 = (20 + 10) + (4 + 3) + (0.6 + 0.5)

 30 + 7 + 1.1 = 38.1

**Column Addition**

Expanded column addition

34

 15 +

 9 (4 + 5)

 40 . (30 + 10)

49

Compact column addition

59

 27 +

 86 .

 1

Compact column addition to add integers and decimals

28.7

 26.5 +

 55.2 .

 1 1

**Applying appropriate strategies to ‘real life’ problems**

Harry buys a coat for £57.50, a hat for £17.15 and a scarf for £9.99. How much money does he spend altogether?

Subtraction

**Early Subtraction Skills**

Counting objects reliably

Counting forwards and backwards, including over boundaries

8, 9, 10, 11, 12 22, 21, 20, 19, 18

Understand subtraction as taking away

6 – 2 = 4

 

Understand subtraction as finding the difference

 

*“The difference between 5 and 2 is 3”*

Know and use number bonds within 10



Record subtraction as a number sentence using symbols

Understand subtraction is the inverse of addition and derive related facts

10 – 3 = 7 *so* 7 + 3 = 10 *and* 3 + 7 = 10

Use the inverse to calculate unknown amounts

20 - = 9

**Subtraction on a Number Line**

(Labelled and unlabelled number lines)

Count forwards and backwards in jumps of 1

10 – 3 = 7

*Counting backwards from 10*



10 – 3 = 7

*Counting on from 3*



Using a number line to represent subtraction as ‘taking away’

62 - 15 = 47

 47 50 52 62

 -3 -2 -10

Using a number line to ‘take’ a 3 digit number from another 3 digit number

452 – 287 = 165

 165 172 202 252 352 452

 -7 -30 -50 -100 -100

Using a number line to represent subtraction as ‘finding the difference’

62 - 15 = 47 40 + 5 + 2 = 47

Here we have counted to the next ten first.

 + 5 + 40 + 2

15 20 60 62

or…

62 – 15 = 47 40 + 5 + 2 = 47

…multiples of ten first

 + 40

 + 10 + 10 + 10 + 10 +5 +2

15 55 60 62

Using a number line to find the difference between two 3 digit numbers

452 – 287 = 165

 + 13 + 100 + 52

287 300 400 452

*100 + 52 + 13 = 165.*

Using a number line to subtract decimals

80.6 – 32.8 = 47.8

 + 0.2 + 7 + 40 + 0.6

32.8 33 40 80 80.6

*40 + 7 + 0.6 + 0.2 = 47.8*

*Either by ‘finding the difference,’ as shown here.*

*Or by ‘taking away’ down a number line as shown earlier.*

**Compact Column Subtraction**

874 – 523 = 351

800 70 4 8 7 4

 - 500 20 3 - 5 2 3

 300 + 50 + 1 = 351 3 5 1

943 - 627 = 316

 30 1 3 1

 900 40 3 9 4 3

 - 600 20 7 - 6 2 7

 300 + 10 + 6 = 316 3 1 6

If I subtract 7 from 3 I get a negative number so I need to ***steal*** a ten from the tens column. I then calculate 13 – 7 = 6.

932 – 457 = 475

2 subtract 7 equals a negative number so I need to ***steal*** a ten from the tens column. I need to ***steal*** a hundred from the hundreds column to make 120 – 50.

 8 12 1

 9 3 2

* 4 5 7

 4 7 5

Subtracting decimal numbers using compact column method

 5 1

8 6 . 7

 - 4 3 . 8

 4 2 . 9

**Choosing and applying appropriate strategies to solve ‘real life’ problems**

John has £432 and Ben has £307. How much more money does John have than Ben?

A pair of trainers cost £37.65. How much change would you get from £50?

Multiplication

**Early Multiplication Skills**

Counting reliably in different sizes

 = 20 = 10

 5 10 15 20 2 4 6 8 10

Understand doubling 2 equal groups



3 x 2 = 6

3 + 3 = 6



Understand multiplication as repeated addition

  

 5 x 3 = 5 + 5 + 5 = 15

Understand the commutative nature of multiplication

2 x 3 = 6  3 x 2 = 6

Know multiplication facts up to 10 x 10



3 x 9 = 27

4 x 6 = 24

Understand that multiplication is the inverse of division

3 x 6 = 18 6 x 3 = 18 18 ÷ 6 = 3 18 ÷ 3 = 6

Multiply any number by 10, 100 and 1000 using our understanding of place value

63 x 10 = 630

|  |  |  |
| --- | --- | --- |
| Hundreds | Tens  | UnitsWe put a zero in the units column as a place holder. |
|  | 6 | 3 |
| 6 | 3 | 0 |

4.8 x 10 = 48

|  |  |  |  |
| --- | --- | --- | --- |
| Tens | Units | . | Tenths |
|  | 4 | . | 8 |
| 4 | 8 | . | 0 |

**Multiplication on a Number Line**

6 x 2 = 12

(one digit x one digit)

 2 2 2 2 2 2

0 2 4 6 8 10 12

 Or…

 6 6

0 6 12

36 x 5 = 180

 (2 digit x 1 digit)

10 x 5 10 x 5 10 x 5 6x5

0 50 100 150 180

**Grid Method for Multiplication**

17 x 4 = 68

(2 digit x 1 digit)

Step one: Partition the 2 digit number

e.g. 17 = 10 + 7

|  |  |  |
| --- | --- | --- |
| x | 10 | 7 |
| 4 | 40 | 28 |

Step 3: Multiply 4 by 7 = 28

Step 2: Multiply 4 by 10 = 40

 40

Step 4: Add together you two answers from step 2 and step 3 to get your final answer

e.g. 40 + 28 = 68

Therefore, 17 x 4 = 68

+ 28

 78

500

 150

 + 30

 680

136 x 5 = 680

(3 digit x 1 digit)

|  |  |  |  |
| --- | --- | --- | --- |
| X | 100 | 30 | 6 |
| 5 | 500 | 150 | 30 |

46 x 13 = 598

400

120

 60

 + 18

 598

(2 digit x 2 digit)

|  |  |  |
| --- | --- | --- |
| x | 40 | 6 |
| 10 | 400 | 60 |
| 3 | 120 | 18 |

16.4 x 6 = 98.4

(Grid Method to multiply decimals)

If I multiply 0.4 I get an answer of 4. I can then do 6 x 4 = 24

|  |  |  |  |
| --- | --- | --- | --- |
| x | 10 | 6 | 0.4 |
| 6 | 60 | 36 | 2.4 |

60

36

 + 2.4

 98.4

Because I multiplied by 10, I must divide the

 answer by 10. 24 ÷ 10 = 2.4

**Apply strategies to ‘real-life’ problems**

There are 38 seats on a coach. How many seats on 10 coaches?

**Short Multiplication**

24 x 6 = 136 342 x 7 = 2394

 24 342

x 6 x 7

 144 2394

 2 2 1

As with the grid method, we multiply units first, then tens, then hundreds.

**Long Multiplication**

(2 digits x 2 digits)

24 x 16 = 384

 2

6 x 4 = 24 (carry 20 into the tens column).

6 x 20 = 120 (add the 20 you carried earlier = 140)

10 x 24 = 240.

144 + 240 = 384

 24

x 16

 144

 240

 **384**

(3 digits x 2 digits)

124 x 26 = 3224

 1 2

6 x 4 = 24 (carry 20 into the tens column).

6 x 20 = 120 (add the 20 you carried earlier = 140)

6 x 100 = 600 (add the 100 you carried earlier = 700)

20 x 124 = 2480

744 + 2480 = 3224

 124

x 26

 744

 2480

 **3224**

 1 1

**Division**

**Early Division Skills**

Counting reliably in different sizes

Understand halving as 2 equal groups

Half of 4 = 2 4 ÷ 2 = 2

    

Understand division as sharing and grouping

8 ÷ 4 = 2 8 in 4 equal groups

8 ÷ 2 = 4 8 shared into 2 equal sets of 4

Grouping

20 ÷ 5= 4

4 groups of 5 = 20

20 in groups of 5 gives 4 groups

Sharing

20 ÷ 5= 4

5 sets of 4 = 20

20 in 5 sets gives 4 in each set

Record division as a number sentence using symbols

Understand that division is the inverse of multiplication

24 ÷ 6 = 4 24 ÷ 4 = 6 6 x 4 = 24 4 x 6 = 24

Divide numbers by 10, 100 & 1000 using our understanding of place value

63 ÷ 10 = 6.3

|  |  |  |  |
| --- | --- | --- | --- |
| Tens  | Units | . | Tenths |
| 6 | 3 |  |  |
| 0 | 6 | . | 3 |

63 ÷ 100 = 0.63

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Tens  | Units | . | Tenths | Hundredths |
| 6 | 3 |  |  |  |
| 0 | 0 | . | 6 | 3 |

**Division on a Number Line**

How many jumps of 2 do I need to reach 8?

8 ÷ 2 = 4

 1 2 3 4

 2 2 2 2

0 2 4 6 8

31 ÷ 5 = 6 remainder 1

 1 2 3 4 5 6

 5 5 5 5 5 5 1 0 5 10 15 20 25 30

**Apply strategies to practical examples involving rounding remainders up or down**

Eggs are packed into boxes of 6. If I pack 50 eggs into boxes, how many full egg boxes will I have?

4 children fit into one car. How many cars will Mr Kolter need to transport 41 children ASSHletics?

Chunking on a Number Line

76 ÷ 4 = 19

 10 x 4 5 x 4 4 x 4

0 40 60 76

***10 + 5 + 4 = 19***

**Chunking**

76 ÷ 4 = 19

1 2 3 4

4 x 10 = 40

4 x 5 = 20 60 (40 + 20)

4 x 4 = 16 76 (60 + 16)

 19

81 ÷ 6= 13 r 3

1 2 3 4

6 x 10 = 60

6 x 3 = 18 78

 13 r3

**Short Division (the ‘Bus Stop Method’)**

98 ÷ 7 = 14

 1 4

7 9 28

432 ÷ 5 = 86 r 2

 0 8 6 r 2

5 4 43 32

**Long Division**

432 ÷ 15 = 28 r 12

 15 4 3 2

 3 0 0 (15 x 20)

 1 3 2

 1 2 0 (15 x 8)

 1 2

**Glossary of Mathematical Terms**

**Arrays** A set of objects or symbols arranged in rows or columns.

**Bridging** Where a calculation requires you to cross a multiple of ten.

**Commutative** The order of the numbers in a calculation can be reversed e.g. 2 + 4 = 6 and 4 + 2 = 6.

**Integers**  A whole number

**Inverse** Reverse operations e.g. addition and subtraction are inverse operations

**Multiple** A number is added to itself a number of times

**Number Bonds** Two numbers that total a whole number

**Number Sentence** A written calculation including an equals sign

**Partitioning** Splitting a number into the value of each digit

**Place Value** The value of each digit in a number depending on its position

**Product** The result of multiplying numbers together

**Re-combining** Adding partitioned numbers back together

**Remainder** The amount ‘left over’ after a division calculation

**Sum** To add together

**Total**  The sum of a set of numbers

http://www.amathsdictionaryforkids.com/