

Mathematics
Number
Language, Layout and Methods



Teachers' Handbook

Primary 4

Vocabulary: four rules (+ - x ÷)

- + add, plus, altogether, total, sum. More than, increase
- Subtract, take away, minus, difference, less than, decrease
- x multiply, times, product
- ÷ Divide, share

Addition

Horizontal addition:

e.g. $4 + 9 + 3$ (start from the left)

'4 and 9 is 13. Add 3 is 16'

Grouping

e.g. $6 + 9 + 4 + 1$

Use knowledge of number bonds e.g.

$$6 + 4 = 10 / 9 + 1 = 10$$

$$10 + 10 = 20$$

TU partition and record

e.g. $25 + 12$

Add tens: $20 + 10 = 30$

Add units: $5 + 2 = 7$

$$30 + 7 = 37$$

Vertical addition

$$\begin{array}{r} \text{T U} \\ 43 \\ + 29 \\ \hline 72 \end{array}$$

-Start in the units

-Carrying figure (1 ten) placed to the **right** of the tens figure.

Subtraction

Horizontal subtraction:

e.g. $9 - 6$

'From 9 take 6' AND 'Take 6 from 9'

-TU partition and record

e.g. $25 - 12$

Take away units: $5 - 2 = 3$

Take away tens: $20 - 10 = 10$

Add the tens and units values e.g. $10 + 3 = 13$

Vertical subtraction

$$\begin{array}{r} \text{T U} \\ 78 \\ - 34 \\ \hline 44 \end{array}$$

Take away 4 from 8 (4)

Take away 3 from 7 (4)

Decomposition

$$\begin{array}{r} \text{T U} \\ 7811 \\ - 57 \\ \hline 24 \end{array}$$

-1 take away 7 I **cannot** do

-Where do I get?

-EXCHANGE 8 tens for 7 tens and 10 units

-Carry 10 units to the units column and add to the units already there e.g. $10 + 1 = 11$ units

$$\begin{array}{r} \text{H T U} \\ 45169 \\ - 278 \\ \hline 291 \end{array}$$

-9 take away 8 I **can** do

-6 take away 7 I **cannot** do

-EXCHANGE 5 hundreds for 4 hundreds and 10 tens

-Carry 10 tens to the tens column and add to the 6 tens already there e.g. $10 + 6 = 16$ tens

$$\begin{array}{r} \text{H T U} \\ 45156 \\ - 278 \\ \hline 288 \end{array}$$

-6 take away 8 I **cannot** do

-EXCHANGE 6 tens for 5 tens and 10 units

-Carry 10 units to the units column and add to the units already there e.g. $10 + 6 = 16$

-5 take away 7 I **cannot** do

-EXCHANGE 5 hundreds for 4 hundreds and 10 tens

-Carry 10 tens to the tens column and add to the 5 tens already there e.g. $10 + 5 = 15$ tens

Multiplication

Repeated addition

e.g. $2 + 2 + 2 + 2 + 2 = 10$

$= 5 \times 2 = 10$

Multiplication Tables

2×2 '2 times 2 is 4'

3×2 '3 times 2 is 6' / '2 times 3 is 6'

4×2 '4 times 2 is 8' / '2 times 4 is 8'

Vertical Multiplication:

$$\begin{array}{r} \text{T U} \\ 32 \\ \times \quad 2 \\ \hline 64 \end{array}$$

'2 times 2 is 4'

'2 times 3 is 6'

Vertical Multiplication (with carrying):

$$\begin{array}{r} \text{T U} \\ 47 \\ \times \quad 2 \\ \hline 94 \end{array}$$

'2 times 7 is 14'

Write down the units and carry 1 ten

'2 times 4 is 8'

8 add 1 is 9

Carry number position: **always** place the carry number to the right of the number it is being added to, units below, tens above.

Division

Division by equal sharing using practical materials e.g. Share 12 cubes equally between 4 people

Division with remainders using practical materials e.g. Share 15 cubes between 4 people. How many are left over?

Introduce the division symbol \div

Primary 5

Place Value:

Use a comma to separate thousands from hundreds

e.g. 3,540

DO NOT use a comma in any calculations

Multiplying by 10 and 100: (without calculation)

Multiply by 10

T U

4 x 10

4 0

H T U

2 4 x 10

2 4 0

Th H T U

1 3 5 x 10

1 3 5 0

Multiply by 100

H T U

9 x 100

9 0 0

Th H T U

3 7 x 100

3 7 0 0

T Th Th H T U

1 3 5 0 x 100

1 3 5 0 0

'All the figures move two places to the left'

'Figures stay in their original order' The decimal point does **NOT** move.

Prime Numbers

'A prime number is one which can be divided by only **itself** and **one**. e.g. 2, 3, 5, 7, 11, 13, 17, 19, 23... **One is not a prime number.**

Factors

The factors of 5 are – 1 and 5 (can divide into 5)

The factors of 12 are – 1, 12

2, 6

3, 4 (can all divide into 12)

Factors can be listed in two ways:

1. Numerical order

Factors of 18: 1, 2, 3, 6, 9, 18

2. In multiplying pairs

Factors of 18: 1, 18

2, 9

3, 6 (these numbers are not called multiples)

Multiples

The multiples of 5 are 5, 10, 15, 20.....

All the numbers into which 5 can divide without a remainder

Long Multiplication

Multiplication by multiples of 10:

$$\begin{array}{r} 23 \\ \times 40 \\ \hline 920 \end{array}$$

Place nought in the units column. It pushes digits of answer one place to the left.

Multiplication by two digit number:

$$\begin{array}{r} 46 \\ \times 27 \\ \hline 322 \quad (\times 7) \\ + 920 \quad (\times 20) \\ \hline 1242 \end{array}$$

- Multiply 46 by 7
- Multiply 46 by 20
- Place 0 in the units column (will push digits one place to the left)
- Multiply 46 by 2
- Add the two products
- Carry number position – **always place the carry number to the right of the number it is being added to, units below, tens above.**

Division:

Division Tables

$$12 \div 2 = 6 \quad \text{ALSO} \quad \text{'How many 2's in 12?'}$$

Division without remainders:

$$\begin{array}{r} 43 \\ 2 \overline{)86} \end{array}$$

'2 into 8 goes 4 times'

ALSO..... 'How many groups of 2 can you make out of 8?'

'How many groups of 2 can you make out of 6?'

'2 into 6 goes 3 times'

Division with remainders:

$$\begin{array}{r} 47 \text{ r } 1 \\ 2 \overline{)95} \end{array}$$

$$\begin{array}{r} 157 \text{ r } 2 \\ 3 \overline{)472} \end{array}$$

'2 into 9 goes 4 times, remainder 1' (how many groups can you make out of 9?)

Carry 1 ten beside the 5 units

The new number is 15

2 into 15 goes 7 times remainder 1' (how many groups can you make out of 15?)

Decimal Fractions:

In P5 work in (a) units and tenths

(b) units (hundredths money only)

$$\frac{4}{10} = 0.4 \quad \text{u. t}$$

$$\frac{9}{100} = 0.09 \quad \text{u. t. h}$$

$$\frac{13}{100} = \frac{1}{10} + \frac{3}{100} = 0.13 \quad \text{u. th}$$

Time:

Time in words (analogue)

14 mins past 5

19 mins to 4

Time in figures (digital)

5 : 14

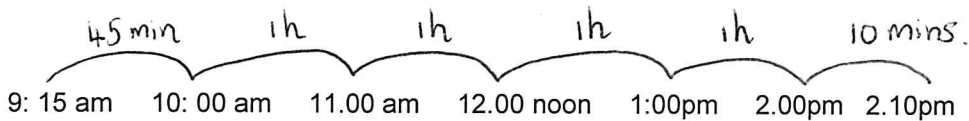
3 : 41

12 and 24 hour times:

12 hour	24 hour	What to say!
12.00 midnight (am)	00:00	This is when a new day begins
3:00 am	03:00	Say '03 hundred'
3: 18 am	03: 18	Say '03 eighteen'
5: 24 pm	17: 24	Say 'seventeen twenty – four'
12:00 midday (pm)	12.00	Say 12 hundred hours

Adding Time:

e.g. 9: 15 am - 2: 10 pm



Ans = 4 hr 55 min

- Count to the next whole hour
- Count full hours
- Count minutes

Perimeter:

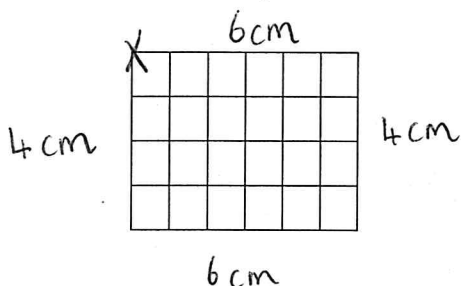
'Perimeter is the distance round the edge of a shape or object'

$$P = l + l + b + b$$

OR

$$P = (l + b) \times 2$$

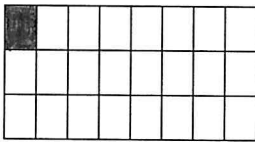
Add edges in a clockwise direction. Start at the top left corner. Put an x if necessary to mark the beginning.



Area:

'Area is the amount of surface a shape has. Areas are measured using squares of equal size'.

- Area is 24 squares
- Each square has an area of one square centimetre
- Area of shape is 24 square centimetres NOT 24 centimetres squared
- $A = 24 \text{ cm}^2$



Primary 6

Multiplying and dividing by 10, 100, 1000:

25.0

2.5 ($\div 10$)

0.25 ($\div 100$)

0.025 ($\div 1000$)

The decimal point is stationary.

Figures move 1, 2, 3 places to the right.

0.456

4.56 ($\times 10$)

45.6 ($\times 100$)

456.0 ($\times 1000$)

The decimal point is stationary.

Figures move 1, 2, 3 places to the left

Rounding off to the nearest 100:

4873

7 in the tens column says: 'round up to 4900'

Rounding off to one decimal place:

17.54

4 in the hundredths column says: 'stay on 17.5'

Place Value:

Use a comma to separate millions, thousands and hundreds

e.g. 7, 523, 540

DO NOT use a comma in any calculations.

Factors:

Set out in 'multiplying pairs' initially

$$20 = (1, 20)$$
$$(2, 10)$$
$$(4, 5)$$

Multiples:

List numbers beginning with the number itself

$$40 = (40, 80, 120, 160, 200)$$

Prime Numbers:

Do NOT include 1

- Ask:
- Can I divide the number by 2 or 5 or 3 or 7?
- 2 – all even numbers (except 2 which is a prime number)
- 5 – all numbers with 5 or 0 in the units
- 3 – add the digits to find those divisible by 3
e.g. 51 ($5 + 1 = 6$)
57 ($5 + 7 = 12$)

Fractions:

Fractions of numbers:

Find $\frac{2}{3}$ of £4.50

$$3 \overline{) 4.50} \left(\frac{1}{3} \right)$$

$$\begin{array}{r} 1.50 \\ \times 2 \\ \hline 3.00 \left(\frac{2}{3} \right) \end{array}$$

$$\text{Ans} = \text{£} 3.00$$

Adding fractions:

$$\frac{2}{3} + \frac{4}{5}$$

Lowest common denominator

$$\frac{10}{15} + \frac{12}{15} = \frac{22}{15} = 1 \frac{7}{15}$$

Multiplying decimal fractions

14.62 x 19 (2 decimal places)

Remove the decimal point at the working out stage

REMEMBER to insert a decimal point in the answer. Look back at the question and count the spaces behind the decimal point. It comes in the same place in the answer.

$$\begin{array}{r} 14.62 \\ \times 19 \\ \hline 13158 \\ 14620 \\ \hline 27778 \end{array}$$

Ans = 277.78

Area:

25 cm² say '25 square centimetres' NOT '25 centimetres squared'

Volume:

36 cm³ say '36 cubic centimetres' NOT '36 centimetres cubed'

Primary 7

Multiplying decimal number by a decimal number:

$$1.238 \times 3.6 \quad (4 \text{ decimal places})$$

Put ticks over the decimal places

$$\begin{array}{r} 1.238 \\ \times 3.6 \\ \hline 7428 \\ 37140 \\ \hline 44568 \end{array}$$

$$\text{Ans} = 4.4568$$

Adding fractions:

$$\begin{aligned} & \frac{3}{8} + \frac{2}{3} \\ = & \frac{9}{24} + \frac{16}{24} \\ = & \frac{25}{24} = 1\frac{1}{24} \end{aligned}$$

Adding mixed numbers: Turn into improper fractions first

$$\begin{aligned} & 3\frac{2}{3} + 1\frac{3}{5} \\ = & \frac{11}{3} + \frac{8}{5} \\ = & \frac{55}{15} + \frac{24}{15} = \frac{79}{15} \\ = & 5\frac{4}{15} \end{aligned}$$

Subtracting fractions:

$$\begin{aligned} & \frac{5}{6} - \frac{2}{5} \\ = & \frac{25}{30} - \frac{12}{30} = \frac{13}{30} \end{aligned}$$

Multiplying fractions:

$$\frac{1}{4} \times \frac{1}{8} = \frac{1}{32}$$

$$3\frac{1}{2} \times 1\frac{5}{7}$$

$$\frac{1}{2} \times \frac{2}{1} = \frac{6}{1}$$

$$= 6$$

Dividing fractions:

Rule: Turn the divider upside down and multiply

① $\frac{4}{5} \div \frac{2}{15}$ ←

$$\frac{4}{5} \times \frac{15}{2} = \frac{6}{1}$$

$$= 6$$

② $2\frac{1}{2} \div \frac{1}{2}$

$$= \frac{5}{2} \div \frac{1}{2}$$

$$= \frac{5}{2} \times \frac{2}{1} = \frac{5}{1}$$

$$= 5$$