| Pupils should be taught to: | As outcomes, Year 4 pupils should, for example: |
|---|---|
| **Choose and use appropriate number operations and appropriate ways of calculating (mental, mental with jottings, written methods, calculator) to solve problems** | Use, read and write:<br>*operation, sign, symbol, number sentence, equation...* |

Make and justify decisions:
* choose the appropriate operation(s) to solve word problems and number puzzles;
* decide whether calculations can be done mentally or with pencil and paper;
* explain and record how the problem was solved.

**For examples of problems see sections on: puzzles (page 78), 'real life' (page 82), money (page 84), measures (page 86) and time (pages 88 and 100).**

Make up 'number stories' to reflect statements like:

| | |
|---|---|
| 435 + 245 = 680 | 90 × 4 = 360 |
| 72 – 25 = 47 | 93 ÷ 3 = 31 |

For example:

Four portions of fries at 90p each cost 360p or £3.60 altogether.

Recognise the operation represented by the ∗ in examples such as:

| | |
|---|---|
| 19 ∗ 21 = 40 | 72 ∗ 29 = 43 |
| 80 ∗ 6 = 480 | 28 ∗ 2 = 14 |

Look at a set of subtractions of different pairs of numbers. Discuss which is easiest/hardest to do and justify why.

| As outcomes, Year 5 pupils should, for example: | As outcomes, Year 6 pupils should, for example: |
|---|---|
| Use, read and write, spelling correctly: *operation, sign, symbol, number sentence, equation…* | Use, read and write, spelling correctly: *operation, sign, symbol, number sentence, equation…* |

Make and justify decisions:
* choose the appropriate operation(s) to solve word problems and number puzzles;
* decide whether calculations can be done mentally or with pencil and paper or a calculator;
* explain and record how the problem was solved.

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* choose the appropriate operation(s) to solve word problems and number puzzles;
* decide whether calculations can be done mentally or with pencil and paper or a calculator;
* explain and record how the problem was solved.

**For examples of problems see sections on: puzzles (page 79), 'real life' (page 83), money (page 85), measures (page 87) and time (pages 89 and 101).**

**For examples of problems see sections on: puzzles (page 79), 'real life' (page 83), money (page 85), measures (page 87) and time (pages 89 and 101).**

Make up 'number stories' to reflect statements like:

$$1435 + 3245 = 4680 \qquad 38.7 \times 24 = 928.8$$
$$572 - 25 = 547 \qquad 564 \div 8 = 70.5$$

For example:
  If 8 equal pieces are cut from 564 mm of string, each piece is 70.5 mm long.

Make up 'number stories' to reflect statements like:

$$143.5 + 32.45 = 175.95 \qquad 6.83 \times 27 = 184.41$$
$$57.2 - 2.56 = 54.64 \qquad 448.91 \div 53 = 8.47$$

For example:
  27 compact discs at £6.83 each will cost £184.41.

Recognise the operation represented by the $*$ in examples such as:

$$319 * 274 = 593 \qquad 572 * 291 = 281$$
$$18 * 6 = 108 \qquad 228 * 38 = 6$$

Recognise the operation represented by the $*$ in examples such as:

$$377 * 58 = 435 \qquad 377 * 58 = 319$$
$$377 * 58 = 6.5 \qquad 377 * 58 = 21\ 866$$

Look at multiplications of different pairs of numbers. Discuss which is easiest/hardest to do and justify why.

Look at divisions of different pairs of numbers. Discuss which is easiest/hardest to do and justify why.

| Pupils should be taught to: | As outcomes, Year 4 pupils should, for example: |
|---|---|
| **Explain methods and reasoning about numbers orally and in writing** | Explain calculations that have wholly or partly been done mentally, beginning to use conventional notation and vocabulary to record the explanation. |

For example:

| | |
|---|---|
| 23 +17 | Add 17 and 3 to get 20, then 20 more to get 40. |
| 32 – 15 | 16 + 16 = 32, so 15 + 17 is the same, so 32 – 15 is 17. |
| 24 × 2 | 24 × 2 is 24 + 24 = 20 + 20 + 4 + 4 = 40 + 8 = 48. |
| 49 + 57 | 9 + 7 = 16 and 40 + 50 = 90, so 90 + 16 is 90, 100, 106. |
| 65 – 28 | 65 – 30 is 35, but this takes away 2 too many, so add back 2 to make 37. |
| 102 + 295 | There are three hundreds and 90 and 7, that's 397. |
| 500 – 180 | Take away 200, that's 300, add 20 is 320. |
| 87 ÷ 2 | Half of 80 is 40, and half of 7 is 3.5, so it's 43.5. |

Extend to calculations that cannot entirely be done mentally.
For example:

| | |
|---|---|
| 447 + 165 | 447 + 100 = 547 |
| | 547 + 60 = 607 |
| | 607 + 5 = 612 |

**See also pencil and paper procedures for:
addition (page 48), subtraction (page 50),
multiplication (page 66) and division (page 68).**

| As outcomes, Year 5 pupils should, for example: | As outcomes, Year 6 pupils should, for example: |
|---|---|

Explain calculations that have wholly or partly been done mentally, and develop the use of conventional notation and vocabulary to record the explanation.

Explain calculations that have wholly or partly been done mentally, using conventional notation and vocabulary to record the explanation.

For example:

For example:

| | |
|---|---|
| $7003 - 6994$ | $6994 + 6 = 7000$, add 3 more is 7003. Answer: 9. |
| $15 \times 12$ | This is $15 \times 4 \times 3 = 60 \times 3 = 180$. |
| $400 \times 80$ | This is the same as $4000 \times 8 = 32\,000$. |
| $49 \times 30$ | $50 \times 30 = 1500$, subtract 30 is 1470. |
| $109 \div 21$ | $21 \times 5 = 105$, plus 4 more is 109. Answer: $5\frac{4}{21}$ |
| $\frac{1}{8}$ of 424 | $\frac{1}{2}$ of $424 = 212$, and $\frac{1}{2}$ of $212 = 106$, and $\frac{1}{2}$ of $106 = 53$, so $\frac{1}{8}$ of $424 = 53$. |

| | | |
|---|---|---|
| $42 \times 15$ | $42 \times 10$ | $= 420$ |
| | $42 \times 5$ | $= 210$ |
| | $42 \times 15$ | $= 630$ |
| $387 \div 9$ | $387 \div 3$ | $= 129$ |
| | $129 \div 3$ | $= 43$ |
| 17.5% of £30 000 | 10% | $= £3000$ |
| | 5% | $= £1500$ |
| | 2.5% | $= £\ 750$ |
| | 17.5% | $= £5250$ |
| $\frac{1}{20}$ of 400 | $\frac{1}{10}$ of $400 = 40$, and $\frac{1}{2}$ of $40 = 20$, so $\frac{1}{20}$ of $400 = 20$. | |

Extend to calculations that cannot entirely be done mentally. For example:

```
    447     round up to      450   – 3
+   165     round down to    150   + 15
                             ‾‾‾   ‾‾‾‾
                             600   + 12 = 612
```

| | |
|---|---|
| $4785 + 3296$ | $7000 + 900 + 170 + 11 =$ <br> $8000 + 81 =$ <br> $8081$ |
| $49 \times 30$ | $(40 \times 30) + (9 \times 30) =$ <br> $1200 + 270 =$ <br> $1470$ |

Compare ways of recording and understand that different ways of recording are equivalent: for example, that $176 \div 28$ is equivalent to $176/28$ and to $28\overline{)176}$.

Extend to calculations that cannot entirely be done mentally. For example:

| | |
|---|---|
| $42 \times 35$ | $(42 \times 30) + (42 \times 5)$ <br> $1260 + (42 \times 5) =$ <br> $1260 + 200 + 10 =$ <br> $1470$ |
| $612 \div 27$ | $\begin{array}{ll} 612 & \\ \underline{540} & 20 \times 27 \\ 72 & \\ \underline{54} & 2 \times 27 \\ 18 & \end{array}$ <br> Answer: $22\frac{18}{27} = 22\frac{2}{3}$ or 22.67 |
| 17.5% of £40 000 | $\frac{17.5 \times 40\,000}{100} =$ <br> $17.5 \times 400 =$ <br> $1750 \times 4 =$ <br> $4000 + 2800 + 200 = 7000$ <br> Answer: £7000 |

Work towards more efficient methods of recording to support and/or explain calculations that are too difficult to do mentally.

Develop efficient methods of recording calculations, including generally applicable or standard written methods for:
• addition and subtraction of whole numbers (three or more digits, including decimals with up to two decimal places);
• long multiplication and division (three digits by two digits).

**See also pencil and paper procedures for: addition (page 49), subtraction (page 51), multiplication (page 67) and division (page 69).**

**See also pencil and paper procedures for: addition (page 49), subtraction (page 51), multiplication (page 67) and division (page 69).**

# SOLVING PROBLEMS

**Solve mathematical problems or puzzles, recognise and explain patterns and relationships, generalise and predict. Suggest extensions by asking 'What if...?'**

Solve puzzles and problems such as:

• Find three consecutive numbers which add up to 39.
  What other numbers up to 50 can you make by adding three consecutive numbers?

• Find a pair of numbers with:
  a sum of 11 and a product of 24;
  a sum of 40 and a product of 400;
  a sum of 15 and a product of 54.

• 72 cubes can be arranged to make a $2 \times 3 \times 12$ cuboid.
  What other cuboids can you make with 72 cubes?

• You can make 6 by using each of the digits 1, 2, 3 and 4 once, and any operation: for example,
  $6 = (21 + 3) \div 4$   or   $6 = (3 \times 4) \div (1 \times 2)$
  Use each of the digits 1, 2, 3 and 4 and any operation to make each number from 1 to 40. Can you go further?

• Arrange the numbers 1, 2, 3... to 9 in the circles so that each side of the square adds up to 12.
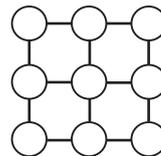


• Draw three rings.
  Use each of the numbers from 1 to 9.
  Write them in the rings so that each ring has a total of 15.
  Find different ways to do it.

• Use a computer program to solve number puzzles: for example, to fill a given number of carriages on a train with given numbers of people.

• Each ◆ represents a missing digit.

  a. Choose three digits from this set: 1, 3, 4, 8.
     Replace each ◆ to make this statement true:
       ◆◆ – ◆ = 38

  b. Find the missing digits.
       4◆ + ◆8 = 74        3◆ – ◆9 = 9         3◆ + ◆7 = 120

  c. Find different ways of completing:
       ◆◆ × ◆ = 252

• Count all the triangles in this diagram (11).



• Start with a rectangular sheet of paper.

  By folding, making one straight cut, and then unfolding, make this hexagon.

## As outcomes, Year 5 pupils should, for example:

Solve puzzles and problems such as:

- Find:
  two consecutive numbers with a product of 182;
  three consecutive numbers with a total of 333.

- Choose any four numbers from the grid.
  Add them up.
  Find as many ways as possible of making 1000.

| 275 | 382 | 81 | 174 |
|-----|-----|-----|-----|
| 206 | 117 | 414 | 262 |
| 483 | 173 | 239 | 138 |
| 331 | 230 | 325 | 170 |

- Use a 'binary tree' computer program to sort a set of numbers according to their properties.

- Write a number in each circle so that the number in each square box equals the sum of the two numbers on either side of it.
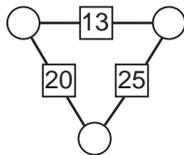


- With 12 squares you can make 3 different rectangles.
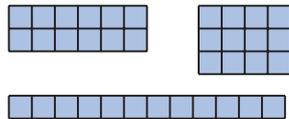


  Find how many squares can be rearranged to make exactly 5 different rectangles.

- A two-digit number is an odd multiple of 9. When its digits are multiplied, the result is also a multiple of 9. What is the number?

- Find ways to complete:  $\square + \triangle + \diamond = 1$

- Each ◆ represents a missing digit.
  Use your calculator to solve:
      ◆◆ × 6◆ = 6272

- A pentomino is a shape made from five identical squares touching edge to edge.

  Divide this shape into two pentominoes.
  Do it in four different ways.
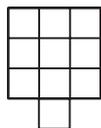


- Count all the rectangles in this diagram (26).
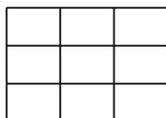


## As outcomes, Year 6 pupils should, for example:

Solve puzzles and problems such as:

- Find:
  two consecutive numbers with a product of 1332;
  two numbers with a product of 899.

- Complete this multiplication table.

| × | | 4 | 9 |
|---|---|---|---|
| | | 8 | 18 |
| 3 | | 12 | |
| | 35 | | 14 |
| | | | 2 |

- Each ◆ represents one of the digits 1 to 6.
  Use each of the digits 1 to 6 once.
  Replace each ◆ to make a correct product.

  $$◆ ◆ × ◆ = ◆ ◆ ◆$$

- A number sequence is made from counters.
  There are 7 counters in the third number.



  How many counters in the 6th number? the 20th...?
  Write a formula for the number of counters in the $n$th number in the sequence.

- For how many three-digit numbers does the sum of the digits equal 25?

- Each letter from A to G is a code for one of these digits: 1, 3, 4, 5, 6, 8, 9.  Crack the code.

  | | | |
  |---|---|---|
  | A + A = B | A × A = DF | A + C = DE |
  | C + C = DB | C × C = BD | A × C = EF |

- Use a computer program to investigate and generalise a number relationship: for example, the number of times a bouncing ball will touch the sides of a billiard table.

- Use a calculator to solve these.

  a. Each ◆ represents a missing digit. Solve:
      ◆2◆ × ◆◆ = 11 316

  b. One whole number divided by another gives 1.1818181. What are the two numbers?

- This is half a shape.
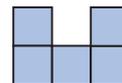


  Sketch some of the different whole shapes the original could have been. Mark any lines of symmetry of these shapes.

- Using straight cuts, divide a square into 6 smaller squares.

| Pupils should be taught to: | As outcomes, Year 4 pupils should, for example: |
|---|---|
| **Make and investigate a general statement about familiar numbers or shapes by finding examples that satisfy it** | Find examples that match a general statement. For example, explain and start to make general statements like: |

Find examples that match a general statement. For example, explain and start to make general statements like:

- *The sum of three odd numbers is odd.*
  Examples:   3 + 5 + 7 = 15   137 + 31 + 465 = 633

- *If 14 < □ < 17, then any number between 14 and 17 can go in the box.*
  Examples:   16,  14.5,  16.99

- *Half way between any two multiples of 10 is a multiple of 5.*
  Examples:   90 and 120 are both multiples of 10;
  half way between them is 105, which is a multiple of 5.

- *Multiples of 4 end in 0, 2, 4, 6 or 8.*
  Examples:   12,  64,  96,  108,  6760

- *Any odd number is double a number add 1.*
  Example:   $63 = 2 \times 31 + 1$

- *If I multiply a whole number by 10, every digit moves one place to the left.*
  Examples:   $63 \times 10 = 630$   $5 \times 10 = 50$   $366 \times 10 = 3660$

- *The perimeter of a rectangle is twice the length plus twice the breadth.*
  Example:   The perimeter of a 5 cm × 3 cm rectangle is:
      5 cm + 3 cm + 5 cm + 3 cm = 16 cm.
  This is the same as 5 cm × 2 add 3 cm × 2.

- *The number of lines of reflective symmetry in a regular polygon is equal to the number of sides of the polygon.*
  Example:   a regular hexagon has 6 sides and 6 lines of symmetry.

Start to express a relationship orally in words.
For example:

- Explain how to find the number of days in any number of weeks.

- Explain how to find the change from £1 after buying two first class stamps.

- Describe a short way to work out the perimeter of a rectangle.

- The rule is add 4. Start with 0. Explain how to find the first five numbers in the sequence. What would the 10th number be?

- A sequence starts 1, 4, 7, 10, 13...
  Explain in words the rule for the sequence.

| Pupils should be taught to: | As outcomes, Year 4 pupils should, for example: |
|---|---|

| As outcomes, Year 5 pupils should, for example: | As outcomes, Year 6 pupils should, for example: |
|---|---|

Find examples that match a general statement.
For example, explain and make general statements like:

- *A multiple of 6 is both a multiple of 2 and a multiple of 3.*
  Example:    48 = 6 × 8 or 3 × 16 or 2 × 24

- *A multiple of 6 is always twice a multiple of 3.*
  Examples:    24 = 2 × 12, and 12 is a multiple of 3;
  60 = 2 × 30, and 30 is a multiple of 3.

- *A number is not a multiple of 9 if its digits do not add up to a multiple of 9.*
  Example:    58 is not a multiple of 9, since 5 + 8 = 13, and 1 + 3 = 4, which is not a multiple of 9.

- *The product of two consecutive numbers is even.*
  Example:    15 × 16 = 240, which is even.

- *If you divide two different numbers the other way round, the answer is not the same.*
  Example:    15 ÷ 3 = 5    3 ÷ 15 = 0.2

- *The perimeter of a regular polygon is length of side × number of sides.*
  Example:    The perimeter of a 9 cm × 9 cm square is 9 cm × 4 = 36 cm.

- *Angles on a straight line add up to 180°.*
  Example:
  58° + 122° = 180°

Find examples that match a general statement.
For example, explain and make general statements like:

- *If 0.24 < □ < 0.27, then any number between 0.24 and 0.27 can go in the box.*
  Examples:    0.25,  0.26,  0.251,  0.267

- *If you add three consecutive numbers, the sum is three times the middle number.*
  Example:    4 + 5 + 6 = 15 = 3 × 5

- *To multiply by 25, multiply by 100 and divide by 4.*
  Example:    12 × 25 = 12 × 100 ÷ 4 = 1200 ÷ 4 = 300

- *Any square number is the sum of two consecutive triangular numbers.*
  Examples:    4 = 1 + 3    25 = 10 + 15    64 = 28 + 36

- *Dividing a whole number by one half makes the answer twice as big.*
  Example:    34 ÷ 0.5 = 68 = 2 × 34

- *If I multiply a decimal number by 10, every digit moves one place to the left.*
  Examples:    6.3 × 10 = 63    0.25 × 10 = 2.5

- *A trapezium is a quadrilateral with one pair of parallel sides.*

- *The sum of the angles of a triangle is 180°.*
  Example:
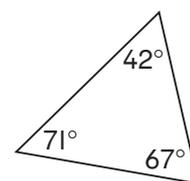  67° + 42° + 71° = 180°

Express a relationship in words, orally and in writing. For example:

- Explain how to find the number of months in any number of years.

- Explain how to find the change from 50p for a number of chews at 4p each.

- Describe a way to calculate the area of a rectangle.

- The rule is double the previous number, add 1. Start with 1. Write the next six numbers in the sequence.

- A sequence starts 1, 4, 9, 16, 25...
  Explain in words the rule for the sequence.

Express a relationship in symbols, and start to use simple formulae. For example:

- Use symbols to write a formula for the number of months *m* in *y* years.

- Write a formula for the cost of *c* chews at 4p each.

- Write a formula for the *n*th term of this sequence:
      3,  6,  9,  12,  15…

- The perimeter of a rectangle is 2 × (*l* + *b*), where *l* is the length and *b* is the breadth of the rectangle. What is the perimeter if *l* = 8 cm and *b* = 5 cm?

- The number of bean sticks needed for a row which is *m* metres long is 2*m* + 1. How many bean sticks do you need for a row which is 60 metres long?

- Plot the points which show pairs of numbers with a sum of 9.

| Pupils should be taught to: | As outcomes, Year 4 pupils should, for example: |
|---|---|
| **Use all four operations to solve word problems involving numbers in 'real life'** | Solve 'story' problems about numbers in real life, choosing the appropriate operation and method of calculation. |

Explain and record using numbers, signs and symbols how the problem was solved.

***Examples of problems***

*Single-step operations*
•  I think of a number, then subtract 18.
   The answer is 26.
   What was my number?

•  A beetle has 6 legs.
   How many legs have 9 beetles?
   How many legs have 15 beetles?

•  Kate has 38 toy cars.
   John has half as many.
   How many toy cars has John?

•  A box holds 70 biscuits.
   How many biscuits are left if you eat 17 biscuits?
   How many people can have 5 biscuits each?
   How many biscuits are there in 6 boxes?
   How many boxes are needed to hold 200 biscuits?

•  To cook rice, you need 5 cups of water for every cup of rice.
   You cook 3 cups of rice.
   How many cups of water do you need?

*Multi-step operations*
•  There are 129 books on the top shelf.
   There are 87 books on the bottom shelf.
   I remove 60 of the books.
   How many books are left on the shelves?

•  There are 4 stacks of plates.
   3 stacks have 15 plates each.
   1 stack has 5 plates.
   How many plates altogether?

•  I think of a number, add 2, then multiply by 3.
   The answer is 15.
   What was my number?

•  There are 36 children in the class.
   Half of them have flavoured crisps.
   One third of them have plain crisps.
   How many children have crisps?

**See also problems involving money (page 84), measures (page 86), time (pages 88 and 100), and puzzles (page 78).**

| As outcomes, Year 5 pupils should, for example: | As outcomes, Year 6 pupils should, for example: |
|---|---|

Solve 'story' problems about numbers in real life, choosing the appropriate operation and method of calculation.

Explain and record using numbers, signs and symbols how the problem was solved.

*Examples of problems*

*Single-step operations*
- Three children play Tiddlywinks.
  What was each child's score?
  | | |
  |---|---|
  | Yasmin | 258 + 103 |
  | Steven | 177 + 92 |
  | Micky | 304 + 121 |

- I think of a number, then divide it by 15.
  The answer is 20.
  What was my number?

- There are 12 eggs in a box.
  How many eggs in 9 boxes?
  How many boxes will 192 eggs fill?

- A bus seats 52 people. No standing is allowed.
  17 people got off a full bus. How many were left on?
  How many seats for two people are there?
  How many people can sit on 6 buses?
  How many buses are needed to seat 327 people?

*Multi-step operations*
- I have read 134 of the 512 pages of my book.
  How many more pages must I read to reach the middle?

- There are 8 shelves of books.
  6 of the shelves hold 25 books each.
  2 of the shelves have 35 books each.
  How many books altogether are on the shelves?

- I think of a number, subtract 17, and divide by 6.
  The answer is 20. What was my number?

- You start to read a book on Thursday.
  On Friday you read 10 more pages than on Thursday.
  You reach page 60.
  How many pages did you read on Thursday?

- Ravi bought a pack of 30 biscuits.
  He ate one fifth of them on Thursday.
  He ate one eighth of the remaining biscuits on Friday.
  How many biscuits did he have left?

**See also problems involving money (page 85), measures (page 87), time (pages 89 and 101), and puzzles (page 79).**

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Solve 'story' problems about numbers in real life, choosing the appropriate operation and method of calculation.

Explain and record using numbers, signs and symbols how the problem was solved.

*Examples of problems*

*Single-step operations*
- 12 500 people visited the museum this year.
  This is 2568 more than last year.
  How many people visited the museum last year?

- There are 35 rows of chairs.
  There are 28 chairs in each row.
  How many chairs are there altogether?
  How many rows of chairs do 420 people need?

- A school has 486 pupils and 15 classes.
  What is the average class size?

- Gwen has a box of 250 staples to make kites.
  She uses 16 staples to make each kite.
  How many complete kites can she make?

- Use a calculator or a written method.
  A full box has 180 pins.
  How many full boxes can be made from 100 000 pins?

*Multi-step operations*
- There is space in the multi-storey car park for 17 rows of 30 cars on each of 4 floors.
  How many cars can park?

- 196 children and 15 adults went on a school trip.
  Buses seat 57 people.
  How many buses were needed?

- 960 marbles are put into 16 bags.
  There is the same number of marbles in each bag.
  How many marbles are there in 3 of these bags?

- In a dance there are 3 boys and 2 girls in every line. 42 boys take part in the dance.
  How many girls take part?

- I think of a number, add 3.7 and multiply by 5.
  The answer is 22.5. What was my number?

- Of the 96 children in Y6, three quarters have pets.
  45 children have a dog. 21 children have a cat.
  How many Y6 children have other kinds of pets?

**See also problems involving money (page 85), measures (page 87), time (pages 89 and 101), and puzzles (page 79).**

# SOLVING PROBLEMS

| Pupils should be taught to: | As outcomes, Year 4 pupils should, for example: |
|---|---|
| **Use all four operations to solve word problems involving money** | |

Use, read and write:
*money, coin, pound, £, pence, note, price, cost, cheaper, more expensive, pay, change, total, value, amount...*

Solve problems involving money, choosing the appropriate operation. Explain and record how the problem was solved. For example:

*Shopping problems*
- What is the total cost of a £4.70 book and a £6.10 game?

- It costs 80p for a child to swim.
  How much does it cost for 6 children to swim?

- A jigsaw costs 65p. How many can you buy for £2?
  How much change do you get?

- A CD costs £4.
  Parveen saves 40p a week.
  How many weeks must she save to buy the CD?

- Lauren has three 50p coins and three 20p coins.
  She pays 90p for a Big Dipper ride.
  How much does she have left?

- Dad bought 3 tins of paint at £5.68 each.
  What was his change from £20?

- Peter offered two silver coins to pay for a 14p pencil.
  Investigate how much change he got.

- A chocolate bar costs 19p.
  How many bars can be bought for £5?

- For her party Asmat spent:

  | £2.88 on apples | | £3.38 on bananas | | £3.76 on oranges |
  |---|---|---|---|---|

  Will a £10 note cover the cost? Explain your reasoning.

*Converting pounds to pence and vice versa*
- How many pence is:    £1.57...    £10.50...    £31.06...?
- Write in pounds:        356p...    970p...    2040p...

*Calculating fractions*
- Harry spent one quarter of his savings on a book.
  What did the book cost if he saved: £8... £10... £2.40...?

- Gran gave me £8 of my £10 birthday money.
  What fraction of my birthday money did Gran give me?

Use, read and write, spelling correctly, the vocabulary of the previous year, and extend to: *discount...*

Solve problems involving money, choosing the appropriate operation. Explain and record how the problem was solved. For example:

*Shopping problems*
- Find the total of:
  £9.63, £15.27 and £3.72;
  66p, 98p, 48p and £3.72.

- How much does one of each cost?

  | 4 for £1.00 | 10 for £2.50 | 6 for £3.24 |

- What change do you get from £20 for £13.68?

- Kobi saved 15p a week for one year.
  How many pounds did he save?

- Four people paid £72 for football tickets.
  What was the cost of each ticket?
  How much change did they get from £100?

- Petrol costs 64.2p per litre.
  What do you pay to fill a 5 litre can?

- Which amounts up to £1 cannot be paid exactly with fewer than six coins?

- You have four 35p and four 25p stamps.
  Find all the different amounts you could stick on a parcel.

- Take £1 worth of coins: four 1p, three 2p, four 5p, three 10p and two 20p.
  Find all the different ways of using the coins to pay 50p exactly.

*Converting foreign currency*
- Exchange rates for £1 are:

  | 1.6 US dollars |
  | 8.7 French francs |
  | 220 Spanish pesetas |

  How many dollars, francs, pesetas do you get for £5?

*Calculating fractions and percentages*
- The deposit on a £230 chair is 50%.
  How much is the deposit?

- There is 25% off prices in a sale.
  How much do you get off £36... £1.80...?

Use, read and write, spelling correctly, the vocabulary of the previous year.

Solve problems involving money, choosing the appropriate operation. Explain and record how the problem was solved. For example:

*Shopping problems*
- What is the total of £110.12, £3.43 and £11.07?

- How much does one of each cost?

  | 10 for £3.90 | 100 for £16.00 | 5 for £1.55 |

- Find the cost of 145 bottles of lemonade at 21p each. What change do you get from £50?

- Things at half price now cost:
  £36.18      £111      £27.34      £274.30
  What was the original price of each item?

- Three people won £363 630 on the lottery to be shared equally between them.
  How much does each one get?

- Costs of rides are:

  | Galaxy | £1.65 |
  | Laser | £2.80 |
  | Big wheel | £1.45 |
  | Spaceship | £2.70 |

  Amy went on two rides.
  She had £5.65 change from £10.
  Which two rides did she go on?

- Use a calculator or a written method.
  4030 people go to a football match.
  Each ticket costs £4.25.
  What is the total cost of all the tickets?

*Converting to European or foreign currency*
- There are 1.43 euros to £1.
  What is the price in pounds of a car costing 14 300 euros?

- Use a calculator or a written method.
  There are 2560 lira to £1.
  Find the price in lira of a house costing £60 000.

*Calculating fractions and percentages*
- The agent's fee for selling a house is 5%.
  Calculate the fee on a house sold for £80 000.

- Use a calculator or a written method.
  There is a 15% discount in a sale.
  How much is the discount on £200... £25...?

# SOLVING PROBLEMS

| Pupils should be taught to: | As outcomes, Year 4 pupils should, for example: |
|---|---|

**Use all four operations to solve word problems involving length, mass or capacity**

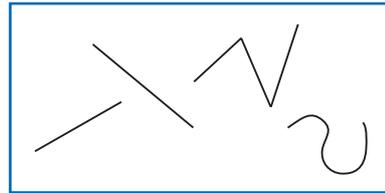Solve 'story' problems involving:
- kilometres, metres, centimetres, millimetres...
- kilograms, half kilograms, grams…
- litres, half litres, millilitres...
- miles, pints...

and explain and record how the problem was solved.

For example:

- Measure the lengths of these lines to the nearest mm.



- Two shelves are 75 cm and 87 cm long.
  What is their total length in metres?
  What is the difference in their lengths in centimetres?

- A family sets off to drive 524 miles.
  After 267 miles, how much further do they have to go?

- A potato weighs about 250 g.
  Roughly how much do 10 potatoes weigh?
  How many times heavier is a 1 kg potato?

- A bottle of salad dressing holds 300 millilitres.
  A tablespoon holds 15 millilitres.
  How many tablespoons of dressing are in the bottle?

- A full jug holds 2 litres.
  A full glass holds ¼ of a litre.
  How many glasses full of water will the jug fill?

- Change this recipe for ginger nuts for 6 people to a recipe for 12 people for a party.

  | | |
  |---|---|
  | 125 g | flour |
  | 50 g | fat |
  | 75 g | sugar |
  | 30 ml | treacle |
  | 1 teaspoon | ground ginger |

- Each side of a regular hexagon is 14 centimetres long.
  How long is its perimeter?

**See also problems involving numbers in 'real life' (page 82), money (page 84), time (pages 88 and 100), and puzzles (page 78).**

| As outcomes, Year 5 pupils should, for example: | As outcomes, Year 6 pupils should, for example: |
|---|---|

Solve 'story' problems involving:
- kilometres, metres, centimetres, millimetres…
- kilograms, grams...
- litres, millilitres...
- miles, gallons, pints...

and explain and record how the problem was solved.

For example:

- There is 365 ml of milk in a jug.
  Another 450 ml of milk is added.
  How much milk is in the jug now?

- Dad bought a 2 kg bag of carrots.
  He used 400 grams of carrots to make some soup.
  How many grams of carrots were left?

- The football club has 400 litres of soup for the fans.
  One cup of soup is 250 ml.
  How many fans can have a cup of soup?

- Mum's car holds 40 litres of petrol.
  Dad's van holds two and half times as much.
  How much petrol does the van hold?

- Greg uses 5 tomatoes to make ½ a litre of sauce.
  How much sauce can he make from 15 tomatoes?

- A full bucket hold 5½ litres.
  A full jug holds ½ a litre.
  How many jugs full of water will fill the bucket?

- Change this pancake recipe for 4 people to a recipe for 6 people.

| | |
|---|---|
| 240 g | flour |
| 300 ml | milk |
| 2 | eggs |

Use a written method or a calculator to solve, for example:

- There is 2.2 kg of sugar in a bag.
  How much sugar is there in 10 bags?

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Solve 'story' problems involving:
- kilometres, metres, centimetres, millimetres…
- kilograms, grams...  newtons…
- litres, millilitres, centilitres...
- miles, gallons, pints, pounds, ounces...

and explain and record how the problem was solved.

For example:

- Sarah travelled 34.24 km by car, 2.7 km by bus and 1000 m on foot. How many kilometres did she travel? How many metres?

- I cut 65 cm off 3.5 metres of rope.
  How much is left?

- How many grams of carrots must be added to 2.76 kg to make 5 kg of carrots altogether?

- Which is more:
  10 lb of potatoes or 10 kg of potatoes?

- There is 300 ml of oil in the small bottle.
  There is six and one quarter times as much in the big bottle.
  How much oil is in the big bottle?

- A full bucket hold 3.2 litres.
  A full jug holds 0.2 of a litre.
  How many jugs full of water will fill the bucket?

- Change this cake recipe to metric units.

| | |
|---|---|
| half a pint | water |
| 3 oz | butter |
| 4 oz | sugar |
| 10 oz | flour |
| 1 teaspoon | almond essence |
| 2 | eggs |

Use a written method or a calculator to solve, for example:

- A pin is made from 14 mm of wire.
  How many pins can be made from 1 m of wire?

- There are exactly 2.54 cm to 1 inch.
  1 yard is 36 inches.
  About how many centimetres are there in 1 yard?

- A garage orders 50 000 litres of petrol.
  It sells an average of 1250 litres per day.
  How long does its supply of petrol last?

**See also problems involving numbers in 'real life' (page 83), money (page 85), time (pages 89 and 101), and puzzles (page 79).**

**See also problems involving numbers in 'real life' (page 83), money (page 85), time (pages 89 and 101), and puzzles (page 79).**

| Pupils should be taught to: | As outcomes, Year 4 pupils should, for example: |
|---|---|
| **Use all four operations to solve word problems involving time** | Solve 'story' problems involving units of time, and explain and record how the problem was solved. |

For example:

- Raiza got into the pool at 2:26. She swam until 3 o'clock.
  How long did she swim?

- The cake went in the oven at 1:20.
  It cooked for 75 minutes.
  What time did it come out?

- Lunch takes 40 minutes.
  It ends at 1:10 pm.
  What time does it start?

- Mary got up at 7:35.
  She left for school 45 minutes later.
  Her journey took 15 minutes.
  What time did she arrive at school?

- The football team kicked off at 1:30 pm.
  They played 45 minutes each way.
  They had a 10 minute break at half time.
  At what time did the game finish?

- Jan went swimming on Wednesday, 14 January.
  She went swimming again 4 weeks later.
  On what date did she go swimming the second time?

- The swimming pool shut for repairs on Friday, 20 March.
  It opened again on Friday, 10 April.
  For how many weeks was the swimming pool shut?

Solve 'story' problems involving units of time, and explain and record how the problem was solved.

For example:

- The car race began at 08:45 and finished at 14:35. How long did the race last?

- The sun sets at 19:30 and rises again at 06:30. How many hours of darkness? Of daylight?

- A train leaves at 09:45 h and arrives at 15:46 h. How long does the journey last?

- These are the start and stop times on a video cassette recorder.

      START      14:45
      STOP       17:25

  For how long was the video recording?

- Four children in a relay team swim in a race. Here are their times for each lap.

      LAP 1      Craig      92.4 seconds
      LAP 2      Fiona      86.3 seconds
      LAP 3      Harun      85.1 seconds
      LAP 4      Jenny      91.8 seconds

  What is their total time for the four laps?

**See also using timetables (page 101), problems involving numbers in 'real life' (page 83), money (page 85), measures (page 87), and puzzles (page 79).**

Solve 'story' problems involving units of time, and explain and record how the problem was solved.

For example:

- Lamb must be cooked for 60 minutes for every kg. Chicken must be cooked for 50 minutes for every kg. Complete this table of cooking times.

| kilograms | 1 | 1.5 | 2 | 2.5 | 3 | 3.5 |
|---|---|---|---|---|---|---|
| Cooking time in minutes (lamb) | | | | | | |
| Cooking time in minutes (chicken) | | | | | | |

**See also using timetables (page 101), problems involving numbers in 'real life' (page 83), money (page 85), measures (page 87), and puzzles (page 79).**