# Autumn
## Scheme of learning
# Year 5

#MathsEveryoneCan

# The **White Rose Maths** schemes of learning

## Teaching for mastery

Our research-based schemes of learning are designed to support a mastery approach to teaching and learning and are consistent with the aims and objectives of the National Curriculum.

### Putting number first

Our schemes have number at their heart.
A significant amount of time is spent reinforcing number in order to build competency and ensure children can confidently access the rest of the curriculum.

### Depth before breadth

Our easy-to-follow schemes support teachers to stay within the required key stage so that children acquire depth of knowledge in each topic. Opportunities to revisit previously learned skills are built into later blocks.

### Working together

Children can progress through the schemes as a whole group, encouraging students of all abilities to support each other in their learning.

### Fluency, reasoning and problem solving

Our schemes develop all three key areas of the National Curriculum, giving children the knowledge and skills they need to become confident mathematicians.

## Concrete – Pictorial – Abstract (CPA)

Research shows that all children, when introduced to a new concept, should have the opportunity to build competency by following the CPA approach. This features throughout our schemes of learning.

### Concrete

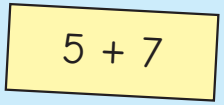
Children should have the opportunity to work with physical objects/concrete resources, in order to bring the maths to life and to build understanding of what they are doing.

### Pictorial

Alongside concrete resources, children should work with pictorial representations, making links to the concrete.
Visualising a problem in this way can help children to reason and to solve problems.


### Abstract

With the support of both the concrete and pictorial representations, children can develop their understanding of abstract methods.




If you have questions about this approach and would like to consider appropriate CPD, please visit whiteroseeducation.com to find a course that's right for you.



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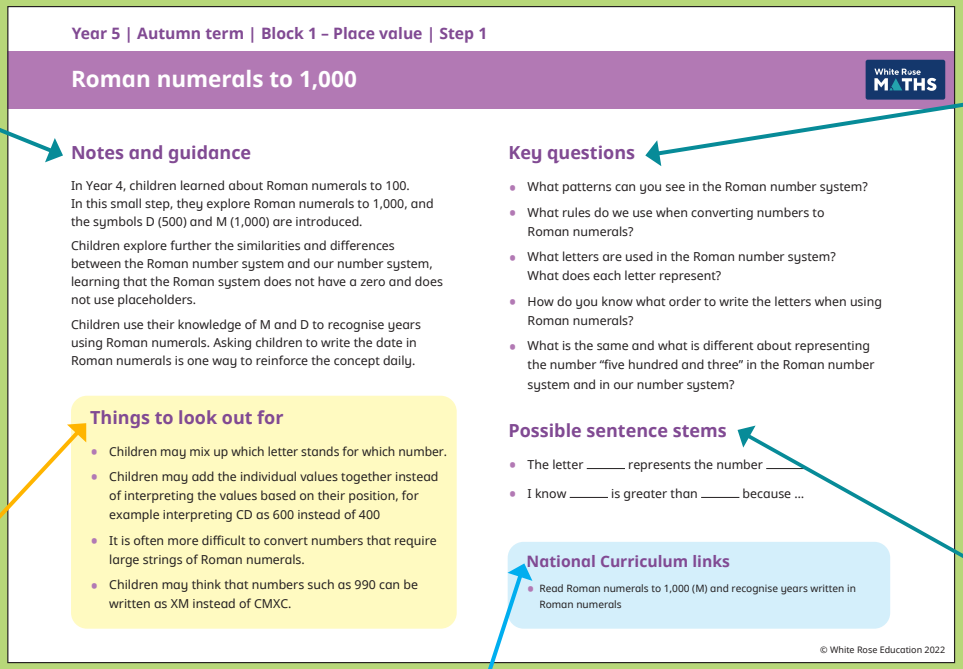
# Teacher guidance

Every block in our schemes of learning is broken down into manageable small steps, and we provide comprehensive teacher guidance for each one. Here are the features included in each step.

**Notes and guidance** that provide an overview of the content of the step and ideas for teaching, along with advice on progression and where a topic fits within the curriculum.



Year 5 | Autumn term | Block 1 – Place value | Step 1

## Roman numerals to 1,000

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### Notes and guidance

In Year 4, children learned about Roman numerals to 100. In this small step, they explore Roman numerals to 1,000, and the symbols D (500) and M (1,000) are introduced.

Children explore further the similarities and differences between the Roman number system and our number system, learning that the Roman system does not have a zero and does not use placeholders.

Children use their knowledge of M and D to recognise years using Roman numerals. Asking children to write the date in Roman numerals is one way to reinforce the concept daily.

### Things to look out for

- Children may mix up which letter stands for which number.
- Children may add the individual values together instead of interpreting the values based on their position, for example interpreting CD as 600 instead of 400
- It is often more difficult to convert numbers that require large strings of Roman numerals.
- Children may think that numbers such as 990 can be written as XM instead of CMXC.

### Key questions

- What patterns can you see in the Roman number system?
- What rules do we use when converting numbers to Roman numerals?
- What letters are used in the Roman number system? What does each letter represent?
- How do you know what order to write the letters when using Roman numerals?
- What is the same and what is different about representing the number "five hundred and three" in the Roman number system and in our number system?

### Possible sentence stems

- The letter _____ represents the number _____
- I know _____ is greater than _____ because ...

### National Curriculum links

- Read Roman numerals to 1,000 (M) and recognise years written in Roman numerals



**Key questions** that can be posed to children to develop their mathematical vocabulary and reasoning skills, digging deeper into the content.

**Things to look out for**, which highlights common mistakes, misconceptions and areas that may require additional support.

**National Curriculum links** to indicate the objective(s) being addressed by the step.

**Possible sentence stems** to further support children's mathematical language and to develop their reasoning skills.



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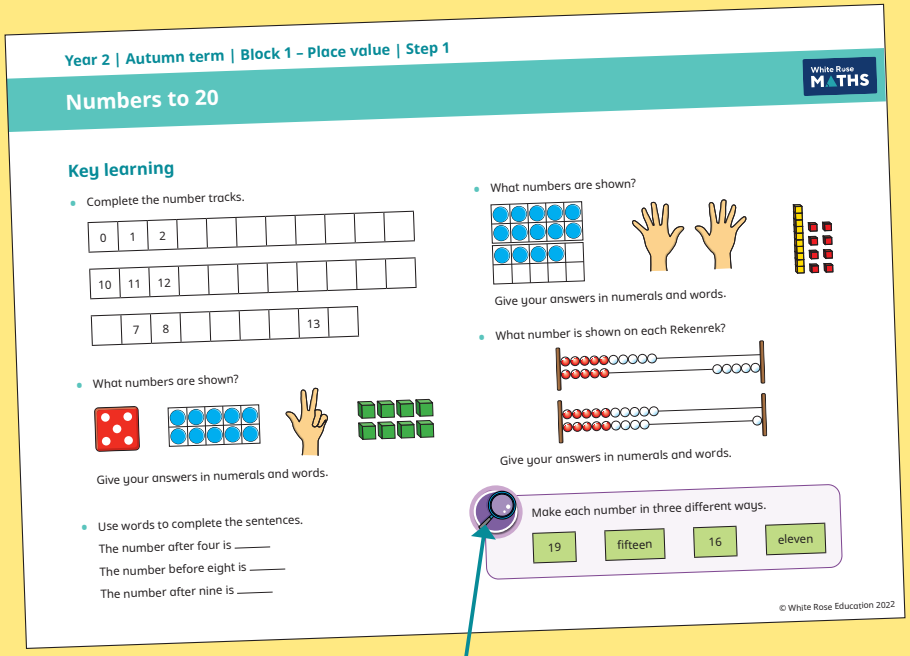
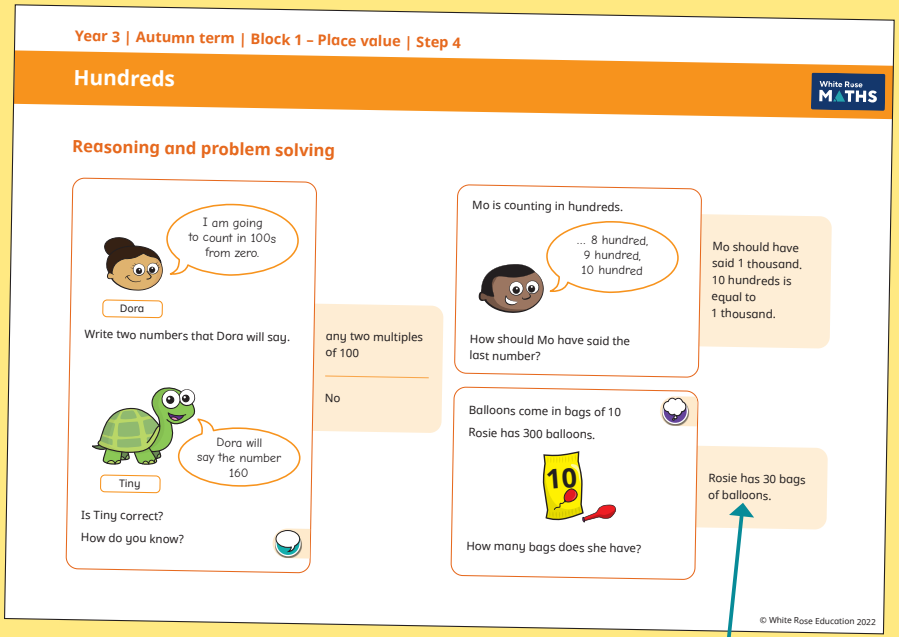
# Teacher guidance

A **Key learning** section, which provides plenty of exemplar questions that can be used when teaching the topic.




Activity symbols that indicate an idea can be explored practically

**Reasoning and problem-solving** activities and questions that can be used in class to provide further challenge and to encourage deeper understanding of each topic.




Answers provided where appropriate

# Activities and symbols

## Key Stage 1 activities

Key Stage 1 includes more hands-on activities alongside questions.

An activity to be led by the teacher

Use a Rekenrek in the ready position.

Ask children to show a number on their Rekenrek.

An outside activity or one that uses resources from nature

Find some seeds and leaves to represent Autumn.

Ask children to sort the objects in three different ways and then compare their answers with a partner.

An activity introduced by a reading from an appropriate fiction or non-fiction book

Read *The Button Box* by M Reid.

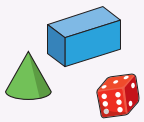
Give children a selection of buttons and ask them to sort the buttons in as many different ways as they can.

Encourage them to think about size, shape, colour and number of holes.

An investigation

Give children a selection of 3D shapes.

Ask children to sort the objects into two groups and then challenge a partner to say how the objects have been sorted.



## Key Stage 1 and 2 symbols

The following symbols are used to indicate:

concrete resources might be useful to help answer the question

a bar model might be useful to help answer the question

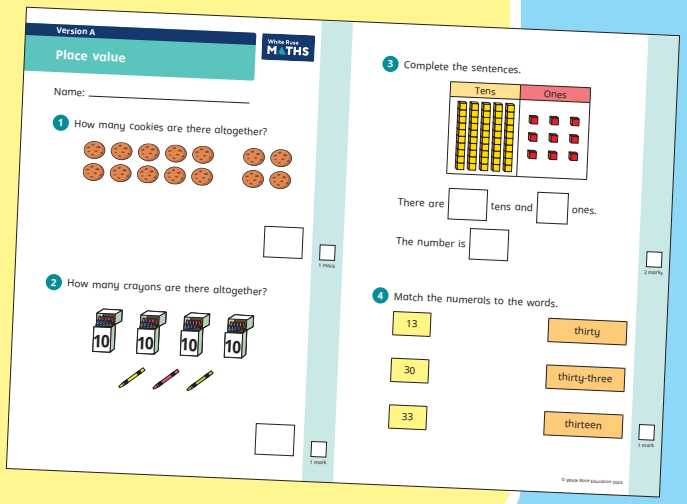
drawing a picture might help children to answer the question

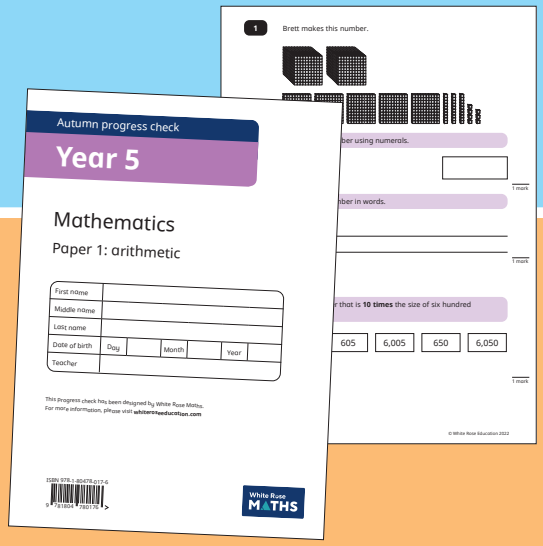
children talk about and compare their answers and reasoning

a question that should really make children think. The question may be structured differently or require a different approach from others and/or tease out common misconceptions.

# Free supporting materials

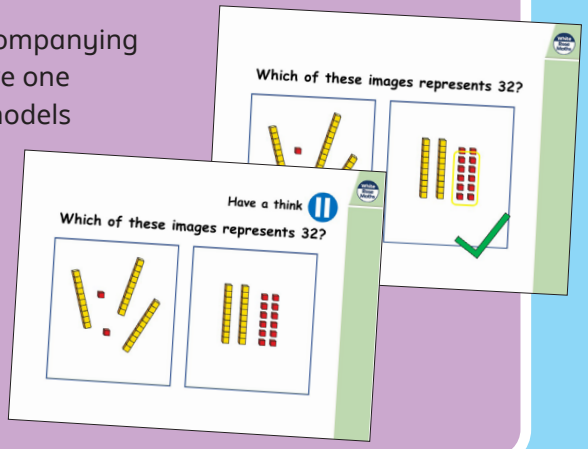
**End-of-block assessments** to check progress and identify gaps in knowledge and understanding.




**End-of-term assessments** for a more summative view of where children are succeeding and where they may need more support.

Each small step has an accompanying **home learning video** where one of our team of specialists models the learning in the step. These can also be used to support students who are absent or who need to catch up content from earlier blocks or years.



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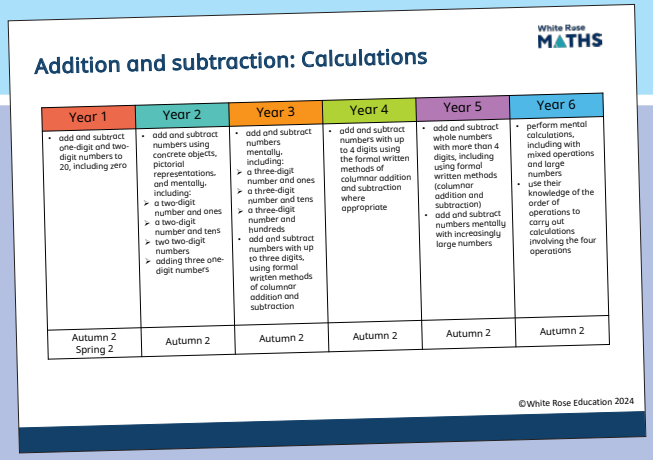
# Free supporting materials



Addition and subtraction: Calculations

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| Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
|---|---|---|---|---|---|
| • add and subtract one-digit and two-digit numbers to 20, including zero | • add and subtract numbers using concrete objects, pictorial representations, and mentally, including:<br>➢ a two-digit number and ones<br>➢ a two-digit number and tens<br>➢ two two-digit numbers<br>➢ adding three one-digit numbers | • add and subtract numbers mentally, including:<br>➢ a three-digit number and ones<br>➢ a three-digit number and tens<br>➢ a three-digit number and hundreds<br>• add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction | • add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate | • add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction)<br>• add and subtract numbers mentally with increasingly large numbers | • perform mental calculations, including with mixed operations and large numbers<br>• use their knowledge of the order of operations to carry out calculations involving the four operations |
| Autumn 2<br>Spring 2 | Autumn 2 | Autumn 2 | Autumn 2 | Autumn 2 | Autumn 2 |

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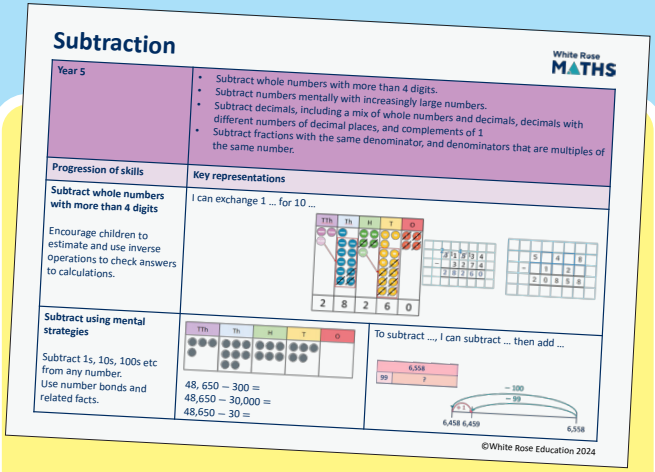
**National Curriculum progression** to indicate how the schemes of learning fit into the wider picture and how learning progresses within and between year groups.



Subtraction

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| Year 5 | • Subtract whole numbers with more than 4 digits.<br>• Subtract numbers mentally with increasingly large numbers.<br>• Subtract decimals, including a mix of whole numbers and decimals, decimals with different numbers of decimal places, and complements of 1<br>• Subtract fractions with the same denominator, and denominators that are multiples of the same number. |
|---|---|
| **Progression of skills** | **Key representations** |
| **Subtract whole numbers with more than 4 digits**<br><br>Encourage children to estimate and use inverse operations to check answers to calculations. | I can exchange 1 ... for 10 ... |
| **Subtract using mental strategies**<br><br>Subtract 1s, 10s, 100s etc from any number.<br>Use number bonds and related facts. | 48, 650 − 300 =<br>48,650 − 30,000 =<br>48,650 − 30 =<br><br>To subtract ..., I can subtract ... then add ... |

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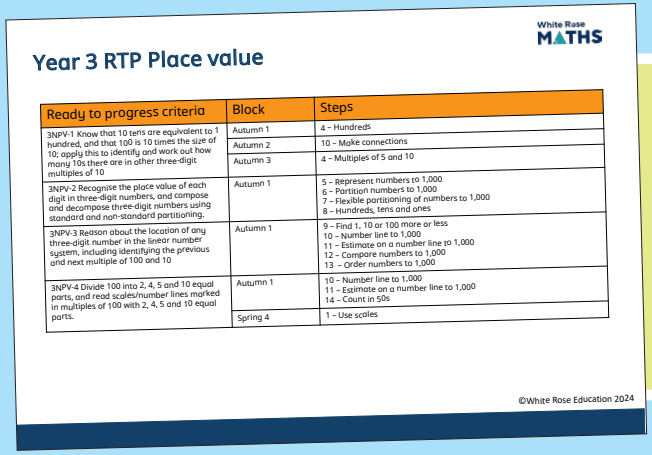
**Calculation policies** that show how key approaches develop from Year 1 to Year 6.



Year 3 RTP Place value

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| Ready to progress criteria | Block | Steps |
|---|---|---|
| 3NPV-1 Know that 10 tens are equivalent to 1 hundred, and that 100 is 10 times the size of 10; apply this to identify and work out how many 10s there are in other three-digit multiples of 10 | Autumn 1 | 4 – Hundreds |
| | Autumn 2 | 10 – Make connections |
| | Autumn 3 | 4 – Multiples of 5 and 10 |
| 3NPV-2 Recognise the place value of each digit in three-digit numbers, and compose and decompose three-digit numbers using standard and non-standard partitioning. | Autumn 1 | 5 – Represent numbers to 1,000<br>6 – Partition numbers to 1,000<br>7 – Flexible partitioning of numbers to 1,000<br>8 – Hundreds, tens and ones |
| 3NPV-3 Reason about the location of any three-digit number in the linear number system, including identifying the previous and next multiple of 100 and 10 | Autumn 1 | 9 – Find 1, 10 or 100 more or less<br>10 – Number line to 1,000<br>11 – Estimate on a number line to 1,000<br>12 – Compare numbers to 1,000<br>13 – Order numbers to 1,000 |
| 3NPV-4 Divide 100 into 2, 4, 5 and 10 equal parts, and read scales/number lines marked in multiples of 100 with 2, 4, 5 and 10 equal parts. | Autumn 1 | 10 – Number line to 1,000<br>11 – Estimate on a number line to 1,000<br>14 – Count in 50s |
| | Spring 4 | 1 – Use scales |

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**Ready to progress** mapping that shows how the schemes of learning link to curriculum prioritisation.



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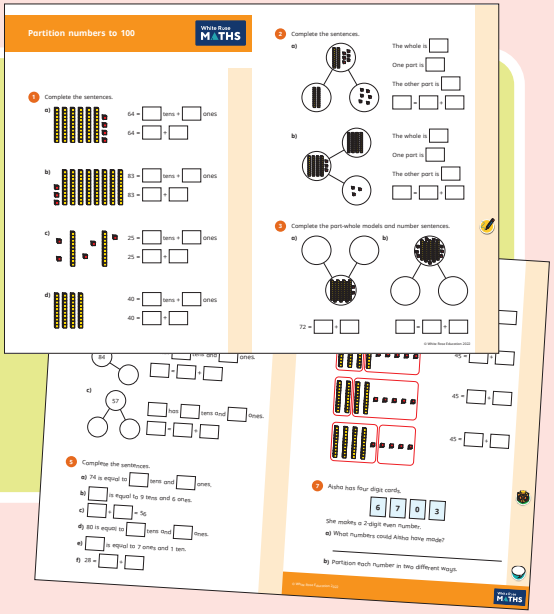
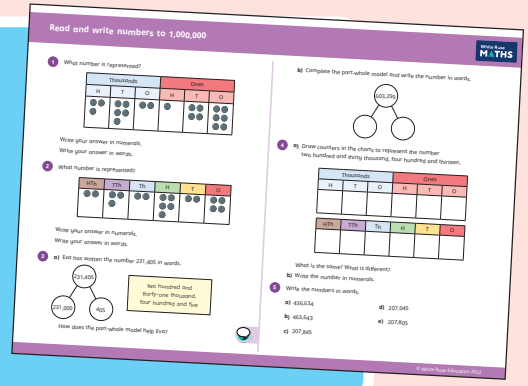
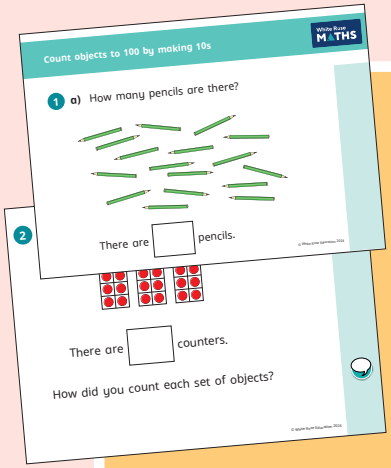
# Premium supporting materials

**Worksheets** to accompany every small step, providing relevant practice questions for each topic that will reinforce learning at every stage.



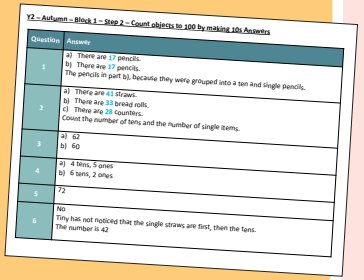

**Display** versions of the worksheet questions for front of class/whole class teaching.

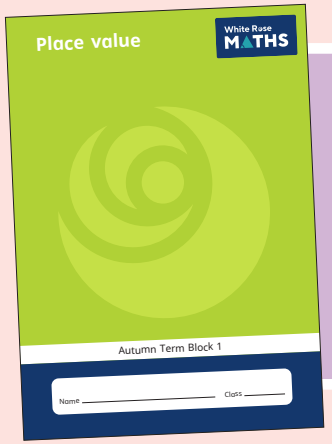



**PowerPoint**™ versions of the worksheet questions to incorporate them into lesson planning.

**Answers** to all the worksheet questions.




Also available as printed **workbooks**, per block.



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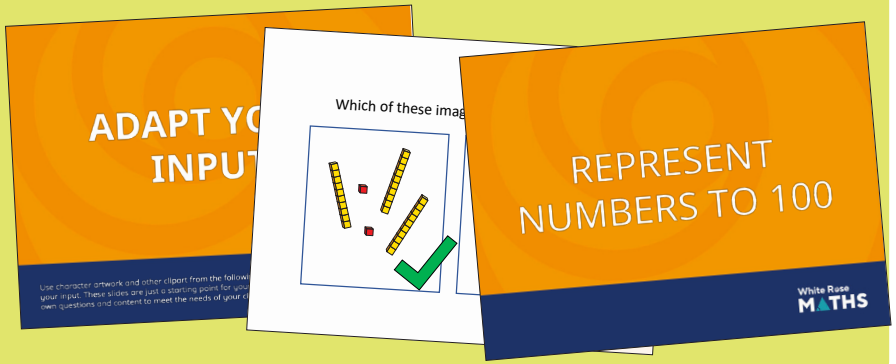
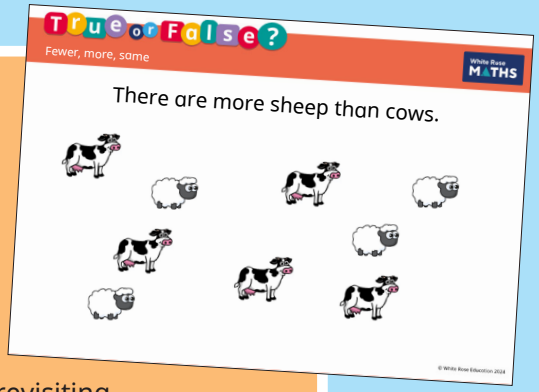
# Premium supporting materials

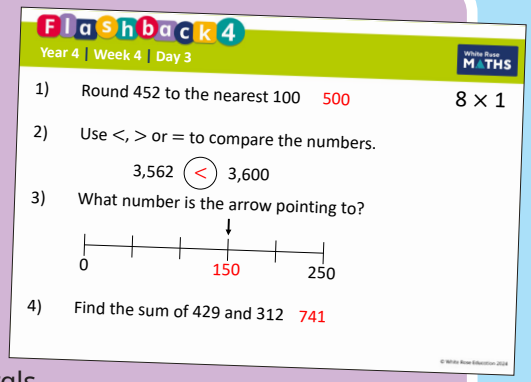
**Adaptable input slides** that mirror the content of our home learning videos for each step. These are fully animated and editable, so can be adapted to the needs of any class.

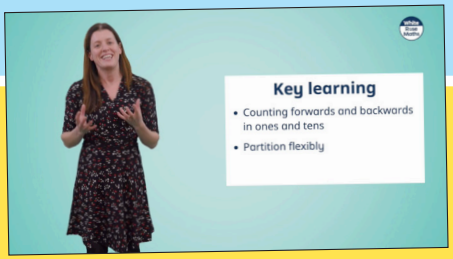



A **true or false** question for every small step in the scheme of learning. These can be used to support new learning or as another tool for revisiting knowledge at a later date.




**Flashback 4** starter activities to improve retention.
Q1 is from the last lesson;
Q2 is from last week;
Q3 is from 2 to 3 weeks ago;
Q4 is from last term/year.
There is also a bonus question on each one to recap topics such as telling the time, times-tables and Roman numerals.




**Topic-based CPD videos**
As part of our on-demand CPD package, our maths specialists provide helpful hints and guidance on teaching topics for every block in our schemes of learning.



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## Meet the characters

Our class of characters bring the schemes to life, and will be sure to engage learners of all ages and abilities. Follow the children and their class pet, Tiny the tortoise, as they explore new mathematical concepts and ideas.

# Yearly overview

The yearly overview provides suggested timings for each block of learning, which can be adapted to suit different term dates or other requirements.

| | Week 1 | Week 2 | Week 3 | Week 4 | Week 5 | Week 6 | Week 7 | Week 8 | Week 9 | Week 10 | Week 11 | Week 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Autumn | Number **Place value** | | | Number **Addition and subtraction** | | Number **Multiplication and division A** | | | Number **Fractions A** | | | |
| Spring | Number **Multiplication and division B** | | | Number **Fractions B** | | Number **Decimals and percentages** | | | Measurement **Perimeter and area** | | Statistics | |
| Summer | Geometry **Shape** | | | Geometry **Position and direction** | | Number **Decimals** | | | Number **Negative numbers** | Measurement **Converting units** | | Measurement **Volume** |



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Autumn Block 1

# Place value

# Small steps

| | |
|---|---|
| Step 1 | Roman numerals to 1,000 |
| Step 2 | Numbers to 10,000 |
| Step 3 | Numbers to 100,000 |
| Step 4 | Numbers to 1,000,000 |
| Step 5 | Read and write numbers to 1,000,000 |
| Step 6 | Powers of 10 |
| Step 7 | 10/100/1,000/10,000/100,000 more or less |
| Step 8 | Partition numbers to 1,000,000 |

# Small steps

| | |
|---|---|
| Step 9 | Number line to 1,000,000 |
| Step 10 | Compare and order numbers to 100,000 |
| Step 11 | Compare and order numbers to 1,000,000 |
| Step 12 | Round to the nearest 10, 100 or 1,000 |
| Step 13 | Round within 100,000 |
| Step 14 | Round within 1,000,000 |

# Roman numerals to 1,000

## Notes and guidance

In Year 4, children learned about Roman numerals to 100. In this small step, they explore Roman numerals to 1,000, and the symbols D (500) and M (1,000) are introduced.

Children explore further the similarities and differences between the Roman number system and our number system, learning that the Roman system does not have a zero and does not use placeholders.

Children use their knowledge of M and D to recognise years using Roman numerals. Asking children to write the date in Roman numerals is one way to reinforce the concept daily.

## Things to look out for

- Children may mix up which letter stands for which number.
- Children may add the individual values together instead of interpreting the values based on their position, for example interpreting CD as 600 instead of 400
- It is often more difficult to convert numbers that require large strings of Roman numerals.
- Children may think that numbers such as 990 can be written as XM instead of CMXC.

## Key questions

- What patterns can you see in the Roman number system?
- What rules do we use when converting numbers to Roman numerals?
- What letters are used in the Roman number system? What does each letter represent?
- How do you know what order to write the letters when using Roman numerals?
- What is the same and what is different about representing the number "five hundred and three" in the Roman number system and in our number system?

## Possible sentence stems

- The letter _____ represents the number _____
- I know _____ is greater than _____ because ...

## National Curriculum links

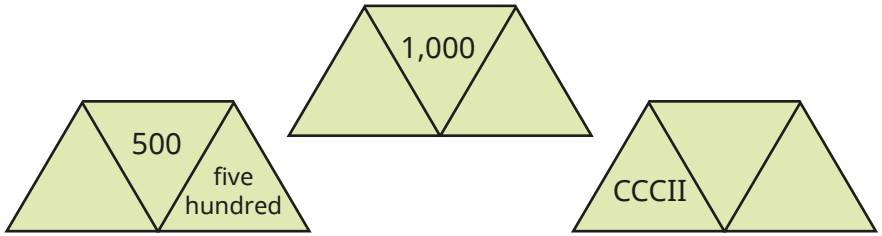
- Read Roman numerals to 1,000 (M) and recognise years written in Roman numerals

# Roman numerals to 1,000

## Key learning

- Each diagram should show a number in Roman numerals, digits and words.

  Complete the diagrams.




- Match the Roman numerals to the numbers.

| | |
|---|---|
| DC | 460 |
| CD | 950 |
| CCCXX | 400 |
| DXC | 590 |
| CML | 600 |
| CDLX | 320 |

- Here is a date written in Roman numerals.

XXI / IX / MMXV

What day of the month is shown?

What month is shown?

What year is shown?

- Here are the end credits of two films.

  The Roman numerals show the year the films were made.



In what year was the older film made?

In what year was the more recent film made?

How long was there between the making of the two films?

Give your answer in Roman numerals.

# Roman numerals to 1,000

## Reasoning and problem solving

Work out CCCL + CL.

Give your answer in Roman numerals.

Write five calculations, using Roman numerals, that give the same answer.

Compare answers with a partner.

D

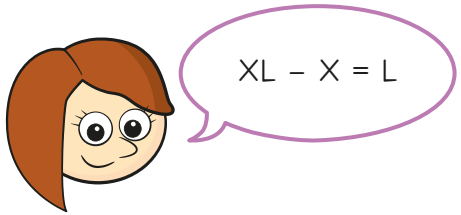
multiple possible answers, e.g.

CD + C

M ÷ II

C + CC + CC

C × V




Do you agree with Rosie?

Explain your answer.

No

Is the statement true or false?

In Roman numerals,
400 is CD,
so 800 is CDCD.

False

The numbers in the sequence are increasing by CXX each time.

□, □, DCCXC, □, □

Work out the missing numbers in the sequence.

DL, DCLXX,

CMX, MXXX

# Numbers to 10,000

## Notes and guidance

Children encountered numbers up to 10,000 in Year 4. In this small step, they revise this learning in preparation for looking at numbers to 100,000 and then 1,000,000

A variety of pictorial and concrete representations are used, including base 10, place value counters, place value charts and part-whole models. In particular, the ability to use place value charts needs to be secure, as this is the main representation used in the coming steps where children learn about 5- and 6-digit numbers.

Children should also be able to add and subtract 10, 100 and 1,000 to and from a given number, using their place value knowledge rather than formal written methods.

## Things to look out for

- Children may not yet have fully grasped placeholders, for example reading 208 as twenty-eight.
- Children may rely on the column method of addition and subtraction when this is not necessary.
- Children may not use, or may misplace, the comma when writing numbers greater than or equal to 1,000

## Key questions

- What is the value of each digit in the number?
- How can you represent the number in a different way?
- Which digit or digits would change in value if you added a 10/100/1,000 counter?
- How do you write the number in words?

## Possible sentence stems

- The value of the _____ in _____ is _____
- The column before/after the _____ column is the _____ column.
- 10 _____ can be exchanged for 1 _____
- 1 _____ can be exchanged for _____

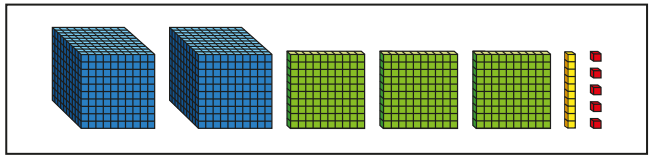
## National Curriculum links

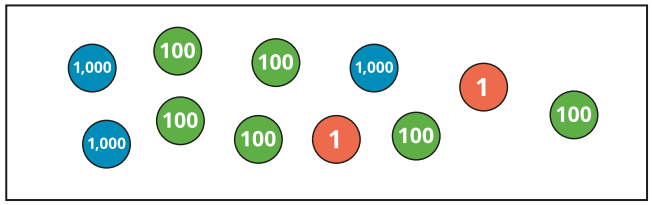
- Read, write, order and compare numbers to at least 1,000,000 and determine the value of each digit
- Count forwards or backwards in steps of powers of 10 for any given number up to 1,000,000

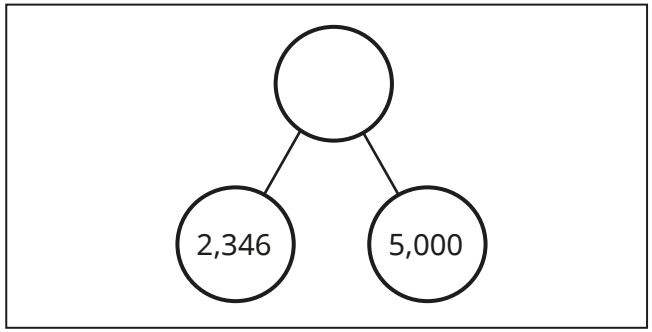
# Numbers to 10,000

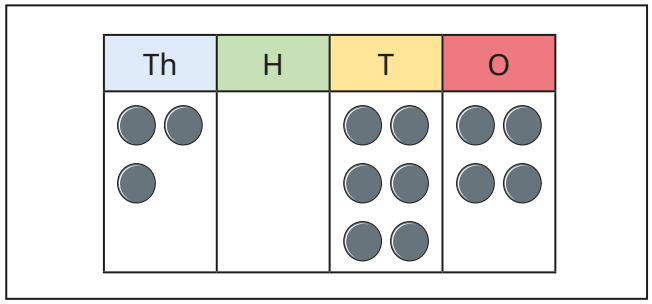
## Key learning

- What numbers are shown?

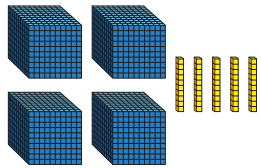


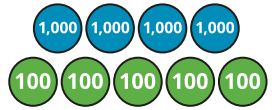


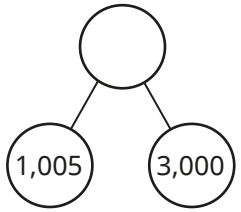




- Match the representations to the numbers.

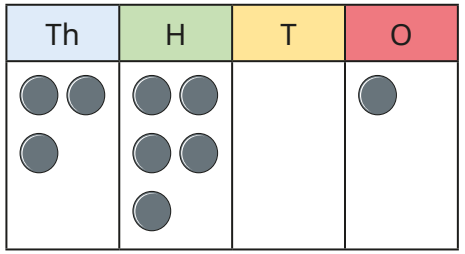





| 4,005 | 4,500 | 4,050 |
|---|---|---|

- Show the number 2,536 in three different ways.
- What number is shown in the place value chart?




What will the number be if you add a counter to the thousands column?

What will the number be if you take two counters away from the hundreds column?

# Numbers to 10,000

## Reasoning and problem solving

Filip has made five numbers using the digits 1, 2, 3 and 4

He is using a letter to represent each digit.

Here are his numbers.

| |
|---|
| AABCD |
| ACDCB |
| DCABA |
| CDADC |
| BDAAB |

Use the clues to work out each number.

- The first number in the list is the greatest number.
- The digits in the fourth number add up to 12
- The third number is the smallest number.

44,231

43,132

13,424

31,413

21,442

Work out the missing numbers.

| | Add 10 | Add 100 | Add 1,000 |
|---|---|---|---|
| 7,516 | | | |
| | | | 5,209 |
| | | 6,025 | |
| | 3,001 | | |

| | Add 10 | Add 100 | Add 1,000 |
|---|---|---|---|
| 7,516 | 7,526 | 7,616 | 8,516 |
| 4,209 | 4,219 | 4,309 | 5,209 |
| 5,925 | 5,935 | 6,025 | 6,925 |
| 2,991 | 3,001 | 3,091 | 3,991 |

# Numbers to 100,000

## Notes and guidance

In this small step, children build on the Year 4 learning revised in the previous step, and explore numbers up to 100,000

They are introduced to the ten-thousands column in a place value chart and begin to understand the multiples of 10,000. This can be reinforced using a number line to 100,000

Both place value counters and plain counters are used in place value charts, allowing for discussion about the values of the columns.

Children estimate the position of numbers such as 65,048 on a number line, preparing them for rounding later in this block.

## Things to look out for

- Children are likely to use "thousands" and "millions" in everyday speech more often than "tens of thousands" or "hundreds of thousands", so they may miss out place value columns in between.
- Children may find numbers with several placeholders difficult, for example 40,020
- Children may need support in deciding when to use the word "and" when saying numbers, for example 3,100 does not use "and" but 3,010 does.

## Key questions

- Counting in 1,000s, what would you say after "nine thousand"?
- Counting in 10,000s, what would you say after "sixty thousand"?
- How can you represent the number 65,000 using a number line?
- What is the value of each digit in the number?
- If 100,000 is the whole, what could the parts be?

## Possible sentence stems

- The value of the _____ in _____ is _____
- The column before/after the _____ column is the _____ column.

## National Curriculum links

- Read, write, order and compare numbers to at least 1,000,000 and determine the value of each digit
- Count forwards or backwards in steps of powers of 10 for any given number up to 1,000,000

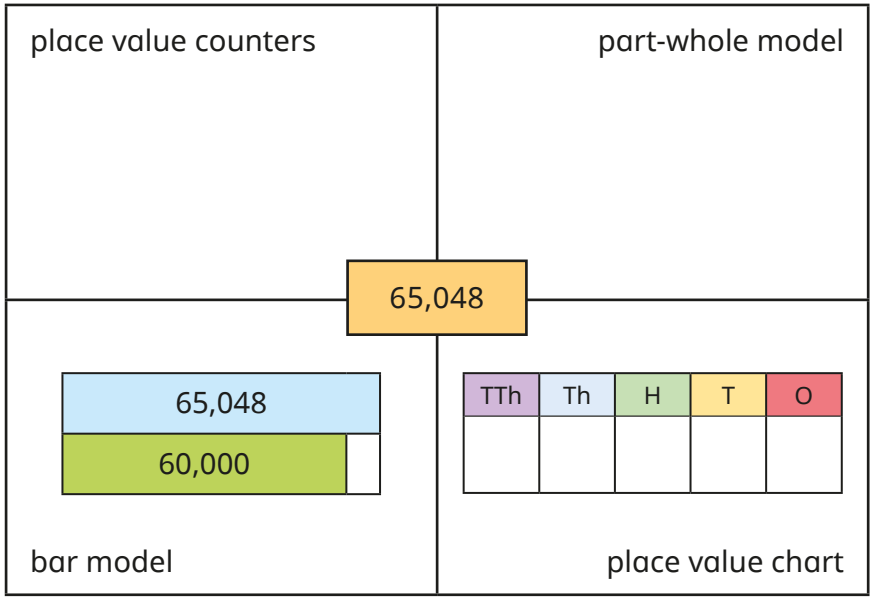
# Numbers to 100,000

## Key learning

- What number is shown on the place value chart?

| TTh | Th | H | T | O |
|---|---|---|---|---|
| 10,000 10,000 10,000 10,000 | 1,000 | 100 100 100 | 10 10 | 1 1 |

- Complete the grid to show the number in different ways.




- Find the missing numbers.
  - 59,000 = 50,000 + _____
  - _____ = 30,000 + 1,700 + 80
  - 75,480 = _____ + 3,000 + _____

  Do any of the questions have more than one possible answer?

- A number is shown in the place value chart.

| TTh | Th | H | T | O |
|---|---|---|---|---|
| ●●● ●● | ●● | ●●● ● | ●●● ●●● ●● | ●●● ●● |

What number is represented?

A counter is removed from the thousands column.
What number is represented now?

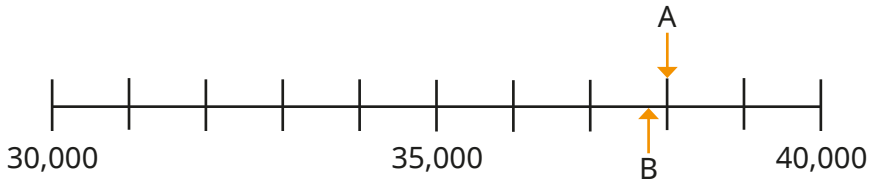
A counter is then added to the tens column.
What number is represented now?

- Count down in 10,000s from 157,000 to 27,000

# Numbers to 100,000

## Reasoning and problem solving

Here is a number line.

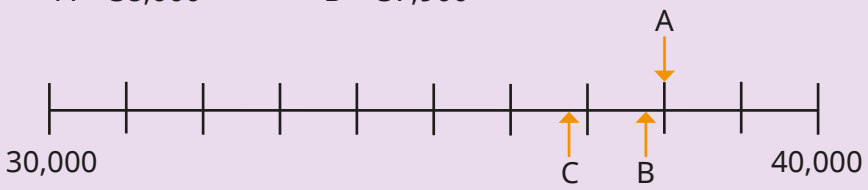



What is the value of A?

B is 100 less than A.
What is the value of B?

C is 1,000 less than B.
Label C on the number line.

A = 38,000 B = 37,900




Write as many different numbers as you can, using each word no more than once.

You do not need to use all the words each time.

| | | |
|---|---|---|
| and | four | thousand |
| one | hundred | |

1, 4, 100, 104, 400, 401, 1,000, 1,004, 1,400, 4,000, 4,001, 4,100, 100,000, 100,004, 104,000, 400,000, 400,001, 401,000

List all the 5-digit numbers you can make using the digit cards.

| | | | | |
|---|---|---|---|---|
| 1 | 2 | 0 | 0 | 0 |

12,000, 10,200, 10,020, 10,002, 21,000, 20,100, 20,010, 20,001

# Numbers to 1,000,000

## Notes and guidance

In this small step, children build on the previous steps and explore numbers up to 1,000,000

Children learn that the pattern for thousands in a place value chart follows the same pattern as that of the ones: ones, tens, hundreds, (one) thousands, ten thousands, hundred thousands. Children recognise large numbers presented in a variety of ways using familiar models. Reading numbers is touched on in this step and then developed in the next step, which also looks at writing numbers in words.

Partitioning is introduced but will be covered in more detail later in the block.

## Things to look out for

- Children may find it difficult to conceptualise such large numbers as they lie outside their everyday experience and cannot easily be represented concretely.
- Unless they are confident with the previous step, children may think that place value columns go in the order ones, tens, hundreds, thousands, millions.
- Children may find numbers with several placeholders difficult.

## Key questions

- Where do the commas go when writing one million in numerals?
- How does a place value chart help you to represent large numbers?
- What is the value of each digit in this number?
- Are 6-digit numbers always greater in value than 5-digit numbers?
- When do you use placeholders in numbers?
- If one million is the whole, what could the parts be?

## Possible sentence stems

- The value of the _____ in _____ is _____
- The column before/after the _____ column is the _____ column.

## National Curriculum links

- Read, write, order and compare numbers to at least 1,000,000 and determine the value of each digit
- Count forwards or backwards in steps of powers of 10 for any given number up to 1,000,000

# Numbers to 1,000,000

## Key learning

- What number is shown in each place value chart?

  Give your answers in numerals.

| HTh | TTh | Th | H | T | O |
|---|---|---|---|---|---|
| ●● ●● | ●● | ●● | ●● ●● | ●● ●● | ● |

| Thousands | | | Ones | | |
|---|---|---|---|---|---|
| H | T | O | H | T | O |
| ●● ●● | ●● | ●● | ●● ●● | ●● ●● | ● |

  What is the same and what is different about these place value charts?

- Use counters to make the numbers on a place value chart.

  32,651 463,215 320,154 60,020

- Count in 100,000s from zero to 1 million.

- Use counters to make the numbers on the place value chart.

  372,524 206,401 300,042 71,560

| Thousands | | | Ones | | |
|---|---|---|---|---|---|
| H | T | O | H | T | O |
| | | | | | |

  How would you say the numbers?

- What is the value of the 4 in each number?

  124,306 245,812 402,001

  321,247 604,513 45,872

- Write four numbers that have a 3 in the hundreds column.

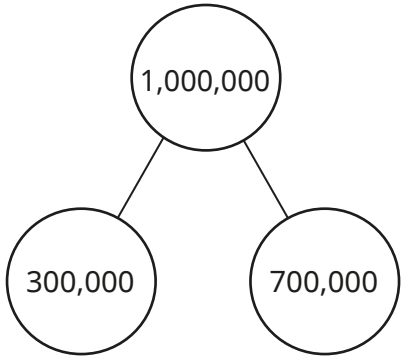
  Each number should have a different number of digits.

# Numbers to 1,000,000

## Reasoning and problem solving

Here are two ways of partitioning one million into multiples of 100,000

| 1,000,000 | |
|---|---|
| 600,000 | 400,000 |




How many other ways can you find to partition one million into multiples of 100,000?

Show your answers as bar models and part-whole models.

There are four more ways:

- 0 and 1,000,000
- 100,000 and 900,000
- 200,000 and 800,000
- 500,000 and 500,000

The numbers can be written in either order.

Use the digit cards to make as many 6-digit numbers as you can.

| | | | | | |
|---|---|---|---|---|---|
| 5 | 5 | 5 | 0 | 0 | 0 |

What is the greatest number you can make?

What is the smallest number you can make?

What is the difference between the greatest and smallest numbers?

Ten 6-digit numbers can be made:

555,000 505,050
550,500 505,005
550,050 500,550
550,005 500,505
505,500 500,055

555,000

500,055

54,945

# Read and write numbers to 1,000,000

## Notes and guidance

Children should be secure with the place value of numbers to 1,000,000. In this small step, they develop their skill at reading and writing large numbers in words, which has been touched on in earlier steps.

While the spelling of the individual words is important, the focus of the step is the structure of the written words, for example we read and write 4,100 as "four thousand one hundred" but 4,010 as "four thousand and ten".

Using a comma as a separator helps with reading and writing numbers in two parts, and a part-whole model or place value chart can be used to support this.

## Things to look out for

- Children who find the "teen" numbers difficult may have problems with numbers such as 317,413
- Children may find reading and writing numbers with placeholders (for example, 700,011) difficult.
- Knowing when to use the word "and" within a number can sometimes cause confusion.

## Key questions

- When a number is written with commas, what do the numbers before/after each comma represent?
- How can this number be represented using a part-whole model? What parts would it be sensible to use?
- How do you write "1,000,000" in words?
- When do you use the word "and" when reading or writing a number?

## Possible sentence stems

- The number before/after the comma is _____. This part of the number is said/written as _____
- The whole of the number is said/written as _____

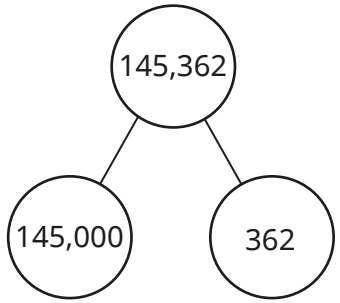
## National Curriculum links

- Read, write, order and compare numbers to at least 1,000,000 and determine the value of each digit
- Solve number problems and practical problems involving the above

# Read and write numbers to 1,000,000

## Key learning

- Scott is using a part-whole model to help write the number 145,362 in words.

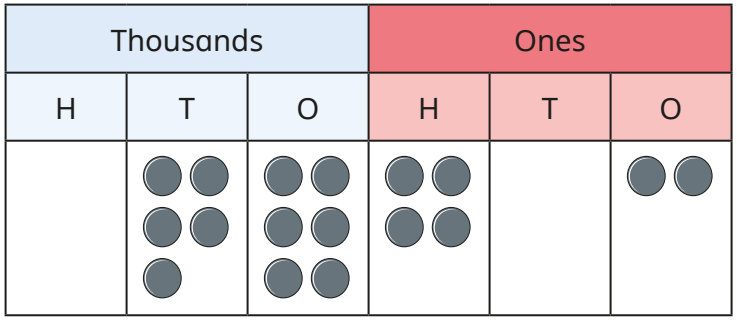



one hundred and forty-five thousand and three hundred and sixty-two

Scott has made one mistake.

Write 145,362 correctly in words.

- 56,402 is shown in the place value chart.




Write the number 56,402 in words.

How does the place value chart help you?

- Write the numbers in words.

| 1,256 | 12,560 | 125,600 | 120,560 | 120,506 |
|---|---|---|---|---|

You could write the numbers in a place value chart to help you.

- A number is made up of 2 ten-thousands, 5 hundreds and 7 ones.

Show the number on a place value chart.

Write the number in words and numerals.

- Write the numbers in numerals.

three hundred and six thousand and fifteen

three hundred and six thousand and fifty

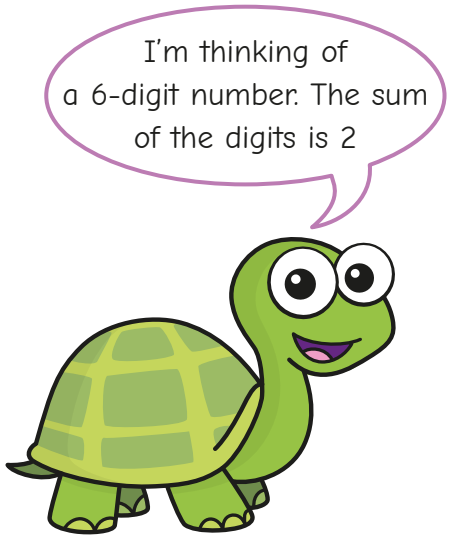
three hundred and fifteen thousand and six

- Use place value counters to make the number "half a million".

Write the number "half a million" in numerals.

# Read and write numbers to 1,000,000

## Reasoning and problem solving




Find all the possible numbers Tiny could be thinking of.

Give your answers in words and numerals.

Investigate with different digit sums.

What do you notice?

200,000
two hundred thousand

110,000
one hundred and ten thousand

101,000
one hundred and one thousand

100,100
one hundred thousand, one hundred

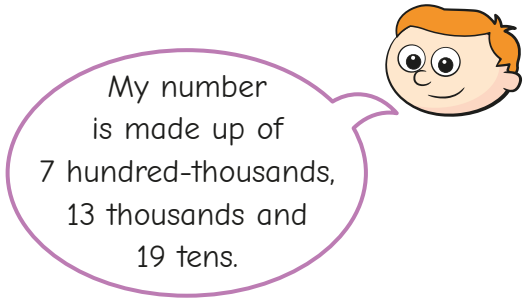
100,010
one hundred thousand and ten

100,001
one hundred thousand and one

When written in words, what is the first number that includes the letter "a"?

one hundred and one

Ron is thinking of a number.




What is 1,000 less than Ron's number?

What is 10 more than Ron's number?

Give your answers in words.

seven hundred and twelve thousand, one hundred and ninety

seven hundred and thirteen thousand, two hundred

# Powers of 10

## Notes and guidance

In this small step, children further develop their understanding of place value by exploring the relationship between numbers in different columns.

As well as adjacent columns, they look at columns that are further apart, for example considering the number of tens needed to make 1,000 and then multiples of 1,000. Children use both place value charts and Gattegno charts to support their understanding. You could demonstrate exchanging with place value counters as extra support if needed.

Multiplication by 10, 100 and 1,000 is covered in detail later in the term. The focus here is on the place value of the digits rather than performing calculations.

## Things to look out for

- Children may not realise that the overall effect of, for example, × 10 followed by × 10 is × 100
- Children may find it confusing that numbers increase by a factor of 10 horizontally on a place value chart but vertically on a Gattegno chart.

## Key questions

- How can you tell if a number is a power of 10?
- Is this number a multiple of a power of 10? How can you tell?
- If you move a digit one place to the left in a place value chart, how many times greater is the value of the digit?
- If you move a digit two places to the left in a place value chart, how many times greater is the value of the digit?
- What patterns can you see in the Gattegno chart?

## Possible sentence stems

- There are _____ hundreds in 1,000 and _____ thousands in _____. This means there are _____ hundreds in _____
- _____ is _____ the size of _____

## National Curriculum links

- Read, write, order and compare numbers to at least 1,000,000 and determine the value of each digit
- Solve number problems and practical problems that involve the above

# Powers of 10

## Key learning

- Make the number 425 on a place value chart.

| Thousands | | | Ones | | |
|---|---|---|---|---|---|
| H | T | O | H | T | O |
| | | | | | |

Now make the number 4,250

What is the same and what is different?

- How many tens are there in 100?

  How many tens are there in 200?

  How many tens are there in 210?

  How many tens are there in 740?

- How many tens are there in 100?

  How many tens are there in 1,000?

  How many tens are there in 2,000?

  How many hundreds are there in 2,000?

- What number is shown on the Gattegno chart?

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 100,000 | 200,000 | 300,000 | 400,000 | 500,000 | 600,000 | 700,000 | 800,000 | 900,000 |
| 10,000 | 20,000 | 30,000 | 40,000 | 50,000 | 60,000 | 70,000 | 80,000 | 90,000 |
| 1,000 | 2,000 | 3,000 | 4,000 | 5,000 | 6,000 | 7,000 | 8,000 | 9,000 |
| 100 | 200 | 300 | 400 | 500 | 600 | 700 | 800 | 900 |
| 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

Use the chart to find the number 100 times the size of the number shown.

Use the chart to make the number one-tenth the size of the number shown.

- Complete the sentences.
  - There are 1,000 metres in a kilometre.

    _____ km is the same distance as 68,000 m.

  - There are 1,000 millimetres in a metre.

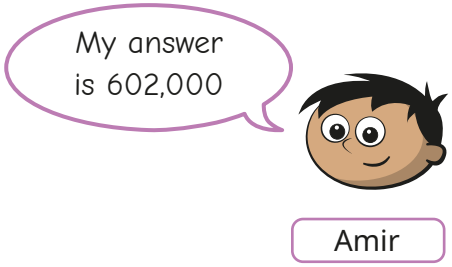
    _____ mm is the same length as 803 m.

# Powers of 10

## Reasoning and problem solving

Whitney and Amir use a Gattegno chart to answer questions.


What could Whitney's question be?




What could Amir's question be?

multiple possible answers, e.g.

What is 10 times the size of 62,000?

multiple possible answers, e.g.

What is 100 times the size of 6,020?

Large areas are measured in hectares.

1 hectare = 10,000 $m^2$

The area of the Eden Park stadium in New Zealand is 15 hectares.

What is the area of Eden Park in $m^2$?

How many plots with an area of 100 $m^2$ could be made in Eden Park?

150,000 $m^2$

1,500

1,000 × 1,000 = 1,000,000

How many other calculations using just ones and zeros can you find that have the answer 1,000,000?

multiple possible answers, e.g.

10,000 × 100

100,000 × 10

1,000,000 × 1

100 × 100 × 100

100 × 10 × 1,000

# 10/100/1,000/10,000/100,000 more or less

## Notes and guidance

In this small step, children use place value to find numbers 10/100/1,000/10,000/100,000 more or less than a given number. They need to be able to count both forwards and backwards in steps of powers of 10, and should be encouraged to spot patterns in the sequences formed by doing this. Children could be stretched to consider the rule that connects consecutive terms in the resulting sequences.

As well as finding consecutive values when counting forwards and backwards, children should also be able to find missing numbers that lie between two other given values.

A Gattegno chart is useful to support adding the correct power of 10, and to see what happens when crossing a 10/100/1,000 … boundary.

## Things to look out for

- Children may make errors when they are counting across a multiple of 10, 100, 1,000 … For example, 2,080, 2,090, 3,000
- More support may be needed when counting backwards.

## Key questions

- How can you use a place value chart to find 10/100/1,000 … more/less than a given number?
- How can you use a Gattegno chart to find 10/100/1,000 … more/less than a given number?
- How many digits of the number will change if you add 10/100/1,000 … to the given number?
- What is the same and what is different about the patterns of the numbers vertically and horizontally in a Gattegno chart?

## Possible sentence stems

- _____ more/less than _____ is _____
- _____ is _____ more/less than _____

## National Curriculum links

- Count forwards or backwards in steps of powers of 10 for any given number up to 1,000,000
- Read, write, order and compare numbers to at least 1,000,000 and determine the value of each digit

# 10/100/1,000/10,000/100,000 more or less

## Key learning

- Here is a Gattegno chart showing the number 32,450

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 10,000 | 20,000 | 30,000 | 40,000 | 50,000 | 60,000 | 70,000 | 80,000 | 90,000 |
| 1,000 | 2,000 | 3,000 | 4,000 | 5,000 | 6,000 | 7,000 | 8,000 | 9,000 |
| 100 | 200 | 300 | 400 | 500 | 600 | 700 | 800 | 900 |
| 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

What number is 10 more than 32,450?

What number is 100 less than 32,450?

What number is 10,000 less than 32,450?

- 20,417 is shown in the place value chart.

| TTh | Th | H | T | O |
|---|---|---|---|---|
| ●● | | ●● ●● | ● | ●● ●● ●● ● |

What is 100 more than 20,417?

What is 10 less than 20,417?

What is 1,000 less than 20,417?

- Complete the number tracks.

| | | | | | | |
|---|---|---|---|---|---|---|
| 663 | 673 | | 693 | | 713 | |

| | | | | | |
|---|---|---|---|---|---|
| 7,200 | | 7,000 | | | |

| | | | | | |
|---|---|---|---|---|---|
| 7,200 | | 6,800 | | | |

- Count up in 1,000s starting from 6,240

Count up in 10,000s starting from 6,240

Count up in 100,000s starting from 6,240

- Correct the mistake in each number sequence.

7,875, 8,875, 9,875, 11,875, 12,875, 13,875

864,664, 764,664, 664,664, 554,664, 444,664

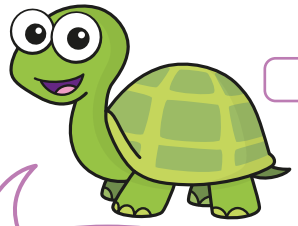
# 10/100/1,000/10,000/100,000 more or less

## Reasoning and problem solving

Amir is counting in thousands.

3,000, 4,000, 5,000, 6,000, 7,000

Amir



Tiny

The tenth number Amir will say is 14,000 because it is double 7,000

Do you agree with Tiny?

Explain your answer.

No

I am counting up in tens from 184 I will include 224

Jack

I am counting up in hundreds from 604 I will include 1,040

Whitney

I am counting up in thousands from 13 I will include 13,000

Teddy

Are the children correct?

Explain how you know.

Jack is correct.

Whitney is incorrect. All her numbers will end in 04

Teddy is incorrect. All his numbers will end in 13

# Partition numbers to 1,000,000

## Notes and guidance

Children have been partitioning numbers since Year 2. In this small step, they extend their knowledge to deal with larger numbers while consolidating their understanding of the place value columns that have been introduced this year.

They partition numbers in the standard way (for example, into thousands, hundreds, tens and ones) as well as in more flexible ways (for example, 15,875 = 14,875 + 1,000 and 15,875 = 13,475 + 2,400).

Understanding of partitioning, for example changing 62 to 50 + 12, supports methods for addition and subtraction that will be reviewed in the next block.

## Things to look out for

- Children may make mistakes with the order of the digits when partitioning/recombining numbers with many digits.
- Children may be less familiar with non-standard partitioning and need the support of, for example, place value counters to see alternatives.
- Children may wish to apply a formal method when the values of the digits in the columns make it more appropriate.

## Key questions

- What number is being represented?
- How can place value cards be used to help partition a number?
- If you have 10 hundreds/thousands/ten-thousands, what can these be exchanged for?
- How does knowing that 9 + 5 = 14 help you to work out 9 tens + 5 tens? What about 9 thousands + 5 thousands?
- How else can you say/write “14 tens” or “14 thousands”?

## Possible sentence stems

- The value of the first digit is _____
- The value of the next digit is _____
- _____ is equal to _____ thousands, _____ hundreds, _____ tens and _____ ones.

## National Curriculum links

- Read, write, order and compare numbers to at least 1,000,000 and determine the value of each digit

# Partition numbers to 1,000,000

## Key learning

- Partition the numbers into thousands, hundreds, tens and ones.
  - 6,789 = _____ + _____ + _____ + _____
  - 4,813 = _____ + _____ + _____ + _____

- Complete the number sentences.
  - _____ = 20,000 + 7,000 + 800 + 40 + 3
  - 560,830 = _____ + 60,000 + _____ + 30

- Move the place value counters around and make exchanges to help you complete the partitions.


32,426 = 30,000 + 2,000 + _____ + 20 + 6

32,426 = 20,000 + _____ + 400 + 10 + _____

32,426 = 10,000 + 22,000 + _____ + _____

Is there more than one answer for any of these?

Find other ways to partition the number.

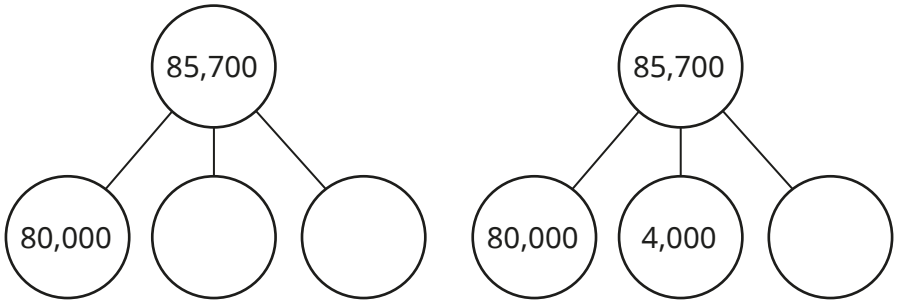
- Aisha is partitioning 45,627

> 40 + 50,000 + 600 + 2 + 7,000 = 45,627

Explain why Aisha's workings are wrong.

Find the correct total.

- Complete the part-whole models for 85,700




Find three more ways of partitioning 85,700 into three parts.

- Complete the calculations.
  - 367,201 = 200,000 + _____
  - 40,000 + 27,600 + 250 = _____
  - 945,006 = 610,000 + _____ + 6

# Partition numbers to 1,000,000

## Reasoning and problem solving

Esther is partitioning a number written in Roman numerals.

MMDXL = M + M + D + X + X + X + X

Is Esther correct?

Find some other ways of partitioning the number using Roman numerals.

Esther is correct.

multiple possible answers, e.g.

MM + CD + C + XL

M + D + D + D + XL

Which is the odd one out?

| | | |
|---|---|---|
| 680,000 | 680 thousands | 68 ten-thousands |
| 5 hundred-thousands plus 180 thousands | 680 hundreds | |

680 hundreds is the odd one out, as it is equal to 68,000

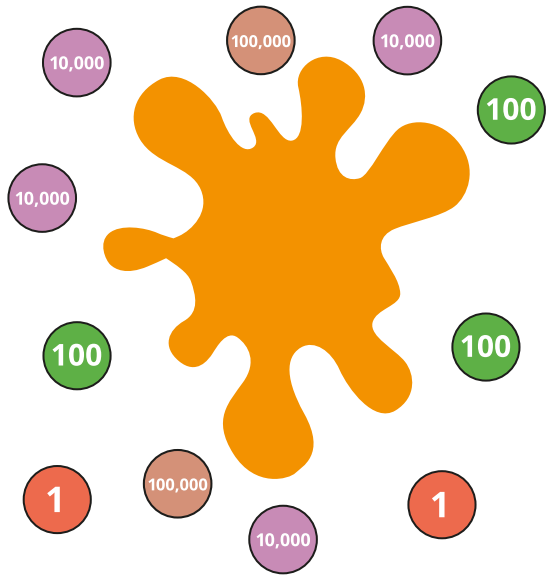
The rest are equal to 680,000

Some of the place value counters are hidden.

The total value of the counters is 265,312

What place value counters could be hidden?

Find at least three solutions.




any set of counters that add up 25,010

multiple possible answers, e.g.

- two 10,000 counters, five 1,000 counters and one 10 counter
- twenty-five 1,000 counters and one 10 counter
- two 10,000 counters, three 1,000 counters, twenty 100 counters and one 10 counter

# Number line to 1,000,000

## Notes and guidance

This step begins with a recap of number lines to 10,000, before moving on to explore number lines up to 100,000 and 1,000,000

Children label partially completed number lines, identify points labelled on number lines and show where a given number would lie on a number line. They look at both the exact placement of multiples of 10,000 or 100,000 and the approximate placement of numbers such as 245,678

Recognising the value of the midpoint between two multiples on a number line is key to their understanding and will support the use of number lines when rounding numbers in later steps.

## Things to look out for

- Where number lines have more than one set of divisions, children may mix up the intervals between large divisions and smaller divisions.
- Children may confuse the number of intervals and the number of divisions.
- Children may not use the correct multiples when looking at midpoints, for example thinking the midpoint between 1,000 and 2,000 is 1,005

## Key questions

- What are the values at the start and the end of the number line?
- How many large intervals are there in the whole number line? What is each large interval worth?
- How many small intervals are there between each of the large intervals on the number line? What is each small interval worth?
- What is the midpoint between _____ and _____?

## Possible sentence stems

- The difference in value between the start and end point is _____
- There are _____ intervals.
- The number line is counting up in _____

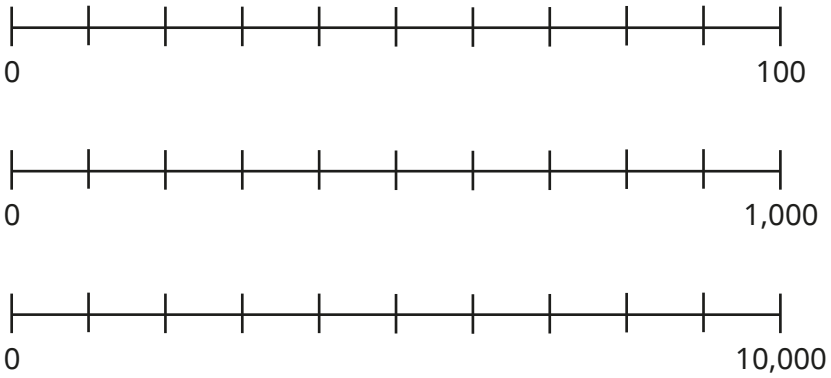
## National Curriculum links

- Read, write, order and compare numbers to at least 1,000,000 and determine the value of each digit
- Count forwards or backwards in steps of powers of 10 for any given number up to 1,000,000

# Number line to 1,000,000

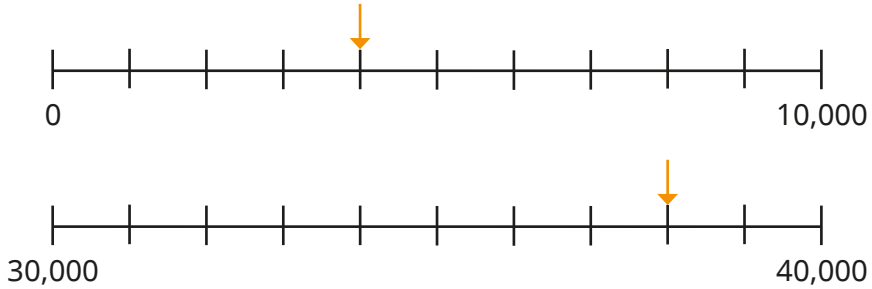
## Key learning

- Label the number lines.

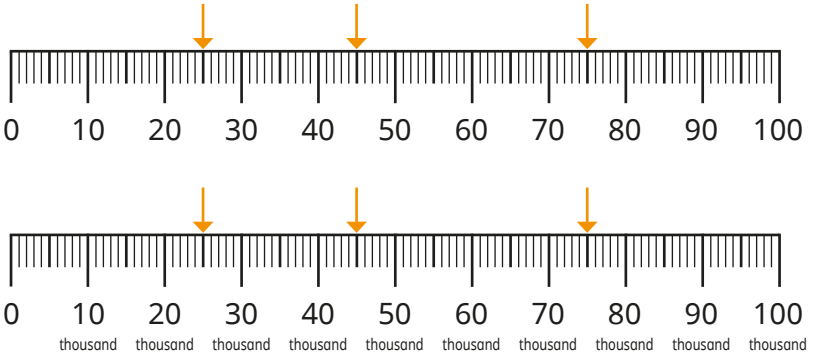



What is the same? What is different?

- What numbers are the arrows pointing to?

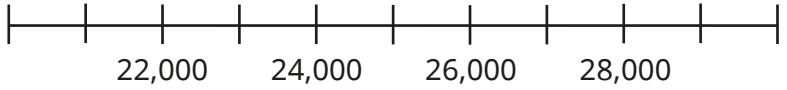


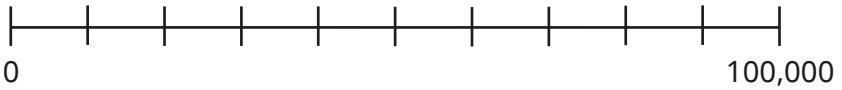

- What numbers are the arrows pointing to?




What is the same about the number lines? What is different?

- Label the start and end points on the number line.




- 

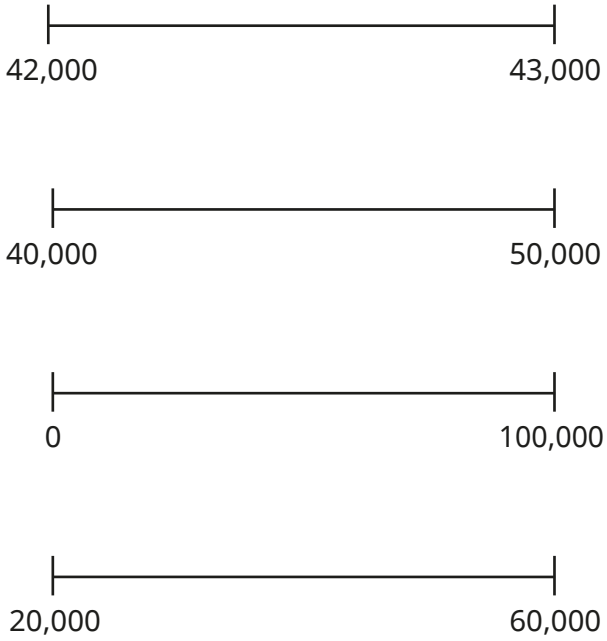

Draw arrows on the number line to show:

- the exact position of 60,000
- the approximate position of 35,000
- the approximate position of 82,369

# Number line to 1,000,000

## Reasoning and problem solving

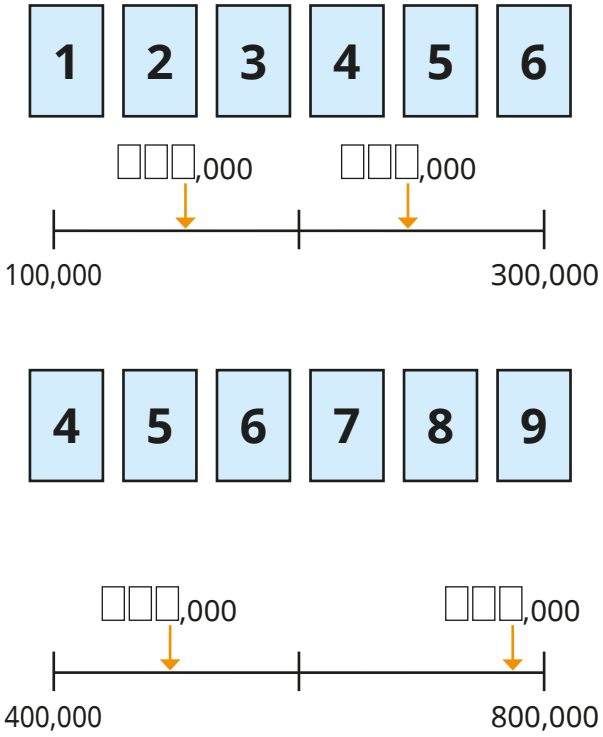
Estimate the position of 42,500 on each number line.




Explain your method.

Children should draw an arrow to the approximate position on each number line and be able to explain their reasoning.

Use the digit cards to complete the labels on the number lines.




multiple possible answers, e.g.

156,000 and 243,000

496,000 and 785,000

# Compare and order numbers to 100,000

## Notes and guidance

In this small step, children build on their learning of comparing and ordering numbers in earlier years to compare and order numbers up to 100,000

They can use a variety of representations to help them, such as place value counters, place value charts and number lines, but the main focus of the step is to compare and order using the place value of the digits within the numbers. Children first compare pairs of numbers and then move on to ordering sets of three or more numbers.

This small step provides an opportunity to revisit previous learning from this block, as children could be asked to compare and order numbers that are written in Roman numerals.

## Things to look out for

- Children may only look at the digits and not consider the place value of the digits within the numbers.
- Where numbers have a different number of digits, children may only look at the first digit.
- Children often confuse the inequality symbols and their meanings.

## Key questions

- Which digit in each number has the greatest value? What are the values of these digits?
- When comparing two numbers with the same number of digits, if their first digits are equal in value, what do you look at next?
- What is the difference between ascending and descending order?
- What is different about comparing numbers with the same number of digits and comparing numbers with different numbers of digits?

## Possible sentence stems

- The first place value column I need to look at is _____
- _____ is greater/less than _____, so _____ is greater/less than _____

## National Curriculum links

- Read, write, order and compare numbers to at least 1,000,000 and determine the value of each digit

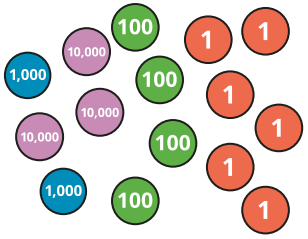
# Compare and order numbers to 100,000

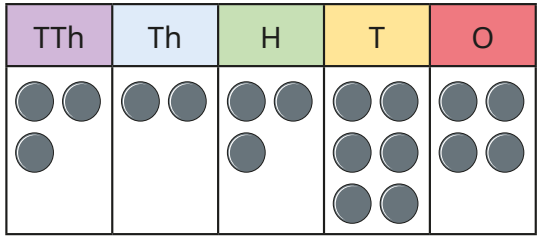
## Key learning

- Identify the greater number in each pair.
  - 63 and 68
  - 63,000 and 68,000
  - 63,912 and 68,002

  What is the same and what is different?

- Which is the greater number?




- Write <, > or = to make the statements correct.

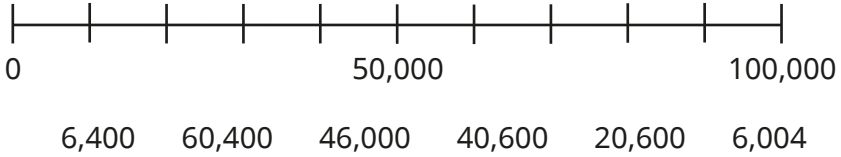
45,000 ◯ 54,000

10,160 ◯ 9,999

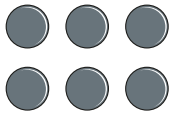
65,000 ◯ 60,700

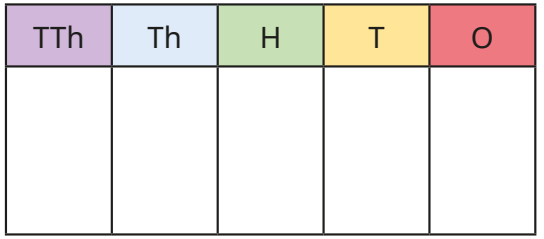
- Put the numbers in order, starting with the smallest.

  You can use the number line to help you.




- Use six counters to make five different 5-digit numbers.






  Order your numbers from greatest to smallest.

- Write the numbers in ascending order.

| | | |
|---|---|---|
| 34,706 | MMMDXL | 3,099 |
| 5,000 more than thirty thousand | | thirty-three thousand and thirty-three |

# Compare and order numbers to 100,000

## Reasoning and problem solving

Any 6-digit whole number is greater than all 5-digit whole numbers.

Do you agree with Dexter?

Explain your answer.

Yes

Here are six digit cards.

| 7 | 2 | 5 | 1 | 9 | 3 |
|---|---|---|---|---|---|

Using five of the digits, what is the greatest number you can make?

Using all six digits, what is the smallest number you can make?

97,532

123,579

Use the digit cards to make three different 5-digit numbers that match the clues.

| 0 | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| 5 | 6 | 7 | 8 | 9 |

- The digit in the ones column and the digit in the hundreds column have a difference of 2
- The digit in the hundreds column and the digit in the ten-thousands column have a difference of 2
- The sum of all the digits in the number is 19

Write your numbers in ascending order.

multiple possible answers, e.g.

18,325

47,260

56,341

# Compare and order numbers to 1,000,000

## Notes and guidance

In this small step, children build on the previous step to compare and order numbers up to 1,000,000

The representations used previously can continue into this step; however, the focus will shift more towards number lines as they are more efficient when representing numbers of increasing value.

Encourage children to make connections between the position of numbers on a number line and their value. They should recognise that when working on horizontal number lines, numbers further to the right have a greater value. Word problems involving real-world examples, such as comparing populations, are also introduced.

## Things to look out for

- Children may only look at the digits and not consider the place value of the digits within the numbers.
- Children may need to be reminded of the meanings of the inequality symbols as well as the words "ascending" and "descending".
- Placeholders can cause difficulty when working with larger numbers.

## Key questions

- Which digit in each number has the greatest value? What are the values of these digits?
- When comparing two numbers with the same number of digits, if their first digits are equal in value, what do you look at next?
- What is the difference between ascending and descending order?
- What is different about comparing numbers with the same number of digits and comparing numbers with different numbers of digits?

## Possible sentence stems

- The first place value column I need to look at is _____
- _____ is greater/less than _____, so _____ is greater/less than _____

## National Curriculum links

- Read, write, order and compare numbers to at least 1,000,000 and determine the value of each digit

# Compare and order numbers to 1,000,000

## Key learning

- Identify the greater number in each pair.
  - 59 | 51
  - 59,000 | 51,000
  - 590,000 | 510,000

  What is the same and what is different?

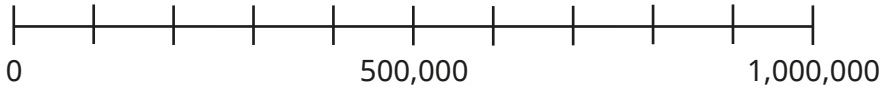
- Write <, > or = to make the statements correct.

  450,000 ◯ 540,000 101,600 ◯ 99,999

  650,000 ◯ 607,000 312,007 ◯ 312,070

- Put the numbers in ascending order.

  You can use the number line to help you.




| | | | | | |
|---|---|---|---|---|---|
| 64,000 | 604,000 | 460,000 | 40,600 | 200,600 | 6,004 |

- The table shows the populations in some towns and cities in Yorkshire.

  List the towns and cities in descending order of population.

| Town or city | Population |
|---|---|
| Halifax | 88,134 |
| Brighouse | 32,360 |
| Leeds | 792,925 |
| Huddersfield | 146,234 |
| Wakefield | 343,932 |
| Bradford | 536,986 |

- Estimate the positions of the numbers on the number line.


**A** four hundred and ten thousand

**B** 95,770

**C** half a million

**D** eight hundred thousand

Write the numbers in ascending order.

# Compare and order numbers to 1,000,000

## Reasoning and problem solving

Here are four number cards.

| | |
|---|---|
| 101,080 | one hundred thousand |
| one thousand one hundred | 99,280 |

Mo, Annie and Ron each choose a card.

My number has the greatest value.

Mo

My number has 8 tens.

Annie

My number is greater than Annie's but less than Mo's.

Ron

Which card is left over?

one thousand one hundred

Write <, > or = to make the statements correct.

600,000 + 80,000 ◯ 618,000

10,000 less than 723,000 ◯ 722,000

999,999 ◯ one million

50,000 ◯ half a million

20 ten-thousands ◯ 200 thousands

>

<

<

<

=

# Round to the nearest 10, 100 or 1,000

## Notes and guidance

In this small step, children build on their knowledge of rounding to the nearest 10, 100 and 1,000 from Year 4, now also rounding numbers beyond 10,000 to these degrees of accuracy.

It is important that children hear and use the language of "rounding to the nearest" rather than "rounding up" and "rounding down", as this can lead to errors. Number lines are a particularly useful tool to support this, as children can see which multiples of 10, 100 or 1,000 the given numbers are closer to. It is worth discussing with children the convention that when there is a 5 in the relevant place value column, despite being exactly halfway between the two multiples, we round to the next one.

## Things to look out for

- Children may not round to the correct degree of accuracy, for example rounding to the nearest 100 instead of the nearest 1,000
- Children may be confused by the language "round down"/"round up" and thus round 72,160 to 71,000 (or 71,160) when asked to round to the nearest 1,000
- Children may look at the thousands digit rather than the hundreds when rounding to the nearest 100

## Key questions

- Which multiples of 10/100/1,000 does the number lie between?
- Which multiple on the number line is the number closer to?
- What is the number rounded to the nearest 10/100/1,000?
- Which place value column should you look at to round the number to the nearest 10/100/1,000?
- What happens when a number is exactly halfway between two numbers on a number line?

## Possible sentence stems

- The previous multiple of 10/100/1,000 is _____
- The next multiple of 10/100/1,000 is _____
- _____ is closer to _____ than _____
- _____ rounded to the nearest 10/100/1,000 is _____

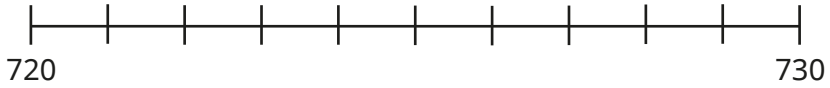
## National Curriculum links

- Round any number up to 1,000,000 to the nearest 10, 100, 1,000, 10,000 and 100,000

# Round to the nearest 10, 100 or 1,000

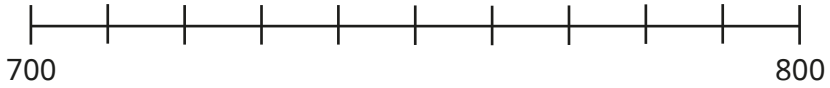
## Key learning

- Mark the position of 728 on the number line.




Use the number line to round 728 to the nearest 10

Now estimate the position of 728 on this number line.




Use the number line to round 728 to the nearest 100

- Between which two multiples of 1,000 does the number 6,741 lie?

  What is 6,741 rounded to the nearest 1,000?

- 3,500 is exactly halfway between 3,000 and 4,000

  What is 3,500 rounded to the nearest 1,000?

- 8,317 people attend a pop concert.

  Round the number of people at the concert to the nearest 10

  Round the number of people at the concert to the nearest 100

  Round the number of people at the concert to the nearest 1,000

- 31,409 people attend a football match.

  Round the number of people at the match to the nearest 100

  Round the number of people at the match to the nearest 1,000


- Eva runs every night for a week.

  Altogether she runs 28,650 m.

  Round the distance she runs to the nearest 100 m.

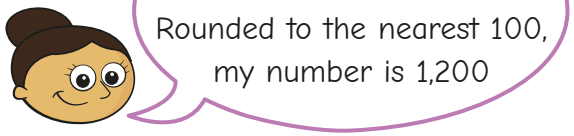
  Round the distance she runs to the nearest kilometre.

- Which numbers round to 4,600 to the nearest 100?

| | | | | | |
|---|---|---|---|---|---|
| 4,620 | 4,605 | 4,590 | 4,545 | 4,499 | 4,650 |

# Round to the nearest 10, 100 or 1,000

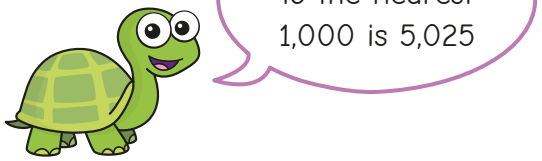
## Reasoning and problem solving




Find all the possible whole number values of Dora's number.

1,150, 1,151, 1,152

1,153, 1,154




Explain why Tiny is wrong.

When rounding to the nearest 1,000, the answer must be a multiple of 1,000

The correct answer is 5,000

When rounded to the nearest 10, a number is 50

When rounded to the nearest 100, the number is zero.

Find all the possible whole number values of the number.

45, 46, 47, 48, 49

Mo is thinking of a number.

- The number is 5,000 when rounded to the nearest 1,000
- The number is also 5,000 when rounded to the nearest 100
- The number is also 5,000 when rounded to the nearest 10
- The number is not 5,000

What is the greatest possible value of the number?

5,004

# Round within 100,000

## Notes and guidance

In this small step, children build on their learning in the previous step to round any number within 100,000 to the nearest 10, 100, 1,000 or 10,000. Rounding to the nearest 10,000 is the new learning.

They should be confident with multiples of 10,000 from earlier steps in this block, and the process of rounding is also familiar. Children need to realise that the midpoint of two multiples of 10,000 ends in 5,000, so they need to look at the digit in the thousands column to determine how to round the number.

As in the previous steps, be careful with the language of "round up" and "round down" in case children mistakenly change the wrong digits when rounding.

## Things to look out for

- Children may not look at the correct column to make their decisions about rounding, for example rounding 24,555 to 30,000 to the nearest 10,000 as they have misapplied the rule "5 or more rounds up".
- Children may be confused by the language "round down"/"round up", for example rounding 78,564 to 88,564 to the nearest 10,000

## Key questions

- Which multiples of 10,000 does the number lie between?
- Which division on the number line is the number closer to?
- What is the number rounded to the nearest 10,000?
- Which place value column should you look at to round the number to the nearest 10/100/1,000/10,000?
- What happens if a number lies exactly halfway between two multiples of 10,000?

## Possible sentence stems

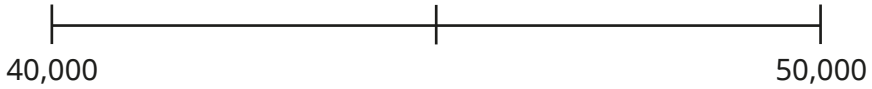
- The previous multiple of 10,000 is _____
- The next multiple of 10,000 is _____
- _____ is closer to _____ than _____
- _____ rounded to the nearest 10,000 is _____

## National Curriculum links

- Round any number up to 1,000,000 to the nearest 10, 100, 1,000, 10,000 and 100,000

# Round within 100,000

## Key learning

- 


  What number is halfway between 40,000 and 50,000?

  Draw an arrow to show the approximate position of 48,725 on the number line.

  Round 48,725 to the nearest 10,000

- Round 86 and 174 to the nearest 10

  Round 86,000 and 174,000 to the nearest 10,000

  What is the same and what is different?

- Round each number to the nearest 10,000

| | |
|---|---|
| 41,000 | 41,900 |
| 41,009 | 41,999 |
| 41,090 | 4,199 |

  What is the same and what is different?

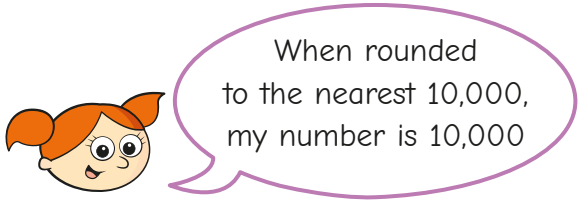
- The circumference of Earth is 24,901 miles.

  Round this distance to the nearest 1,000 miles.

  Round this distance to the nearest 10,000 miles.

  Which is the better approximation to use?

- Alex is thinking of a number.




  Which of these numbers could be Alex's number?

| | | | | |
|---|---|---|---|---|
| 8,000 | 18,000 | 12,000 | 2,000 | 5,000 |

| | | | |
|---|---|---|---|
| 15,000 | 1,500 | 4,999 | 14,999 |

  Explain how you know.

# Round within 100,000

## Reasoning and problem solving

Here is a newspaper headline about a football match.


Do you think exactly 60,000 people watched the football match?

What is the smallest number of people who watched the match, if the number in the headline has been:

- rounded to the nearest 10,000
- rounded to the nearest 1,000
- rounded to the nearest 100?

The headline is probably not an exact value.

55,000

59,500

59,950

The difference between two 5-digit numbers is 5

When the numbers are rounded to the nearest 1,000, the difference is 1,000

What could the numbers be?

any two 5-digit numbers with a difference of 5 where the last three digits are between 496 and 504, for example 52,498 and 52,503

By rounding both numbers to the nearest 10,000, estimate the answer to the calculation.

47,826 + 88,112

Is your estimate greater than or less than the actual answer?

How do you know?

140,000

greater

# Round within 1,000,000

## Notes and guidance

Building on the previous two steps, children now round any number up to 1,000,000 to any power of 10 up to 100,000. This is the first time that children round to the nearest 100,000

You may wish to practise counting in 100,000s first, and then practise rounding to the nearest 100,000 before looking at mixed questions.

It is worth discussing which approximations are most appropriate, for example why we would not give the population of a city to the nearest 10 or the population of a small town to the nearest 100,000

## Things to look out for

- Children may not look at the correct column to make their decisions about rounding, for example rounding 245,555 to 300,000 to the nearest 100,000 as they have misapplied the rule "5 or more rounds to the next multiple".
- Children may be confused by the language "round down"/"round up", for example rounding 428,513 to 328,513 (or 300,000) to the nearest 100,000
- Children may not round to the required degree of accuracy, for example misreading "round to the nearest 100,000" as "round to the nearest 100".

## Key questions

- Which multiples of 100,000 does the number lie between?
- How can you represent the rounding of this number on a number line?
- Which division on the number line is the number closer to?
- What is the number rounded to the nearest 100,000?
- What is the most appropriate way of rounding this number?
- What place value column should you look at to round the number to the nearest 10/100/1,000/10,000/100,000?

## Possible sentence stems

- The previous multiple of 100,000 is _____
- The next multiple of 100,000 is _____
- _____ is closer to _____ than _____
- _____ rounded to the nearest 100,000 is _____

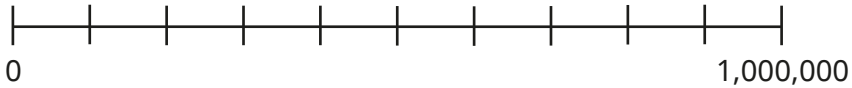
## National Curriculum links

- Round any number up to 1,000,000 to the nearest 10, 100, 1,000, 10,000 and 100,000

# Round within 1,000,000

## Key learning

- Complete the number line.




Between which two multiples of 100,000 does 735,292 lie?

Round 735,292 to the nearest 100,000

- The table shows the masses of some famous statues.

| Statue | Mass |
|---|---|
| Statue of Liberty | 201,400 kg |
| Christ the Redeemer | 635,000 kg |
| Spring Temple Buddha | 987,000 kg |
| Mustang Stone Buddha | 58,000 kg |

Round the mass of each statue to the nearest 10,000 kg.

Round the mass of each statue to the nearest 100,000 kg.

- The average distance of the Moon from Earth is 384,389 km.

Round this distance to the nearest 1,000 km.

Round this distance to the nearest 10,000 km.

Round this distance to the nearest 100,000 km.

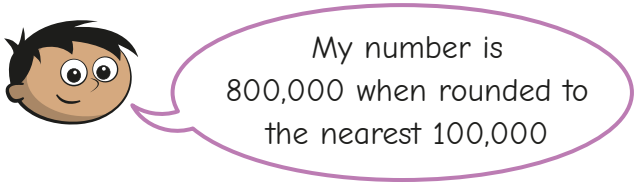
Which do you think is the most appropriate number to round the distance to?

- The greatest ever attendance at a football match was the World Cup final between Brazil and Uruguay in 1950

173,850 people watched the game.

Round this number to the nearest 1,000, 10,000 and 100,000

Which do you think is the most appropriate number to round the attendance to?

- 


What is the greatest integer Amir could be thinking of?

What is the smallest integer Amir could be thinking of?

# Round within 1,000,000

## Reasoning and problem solving

The difference between two 5-digit numbers is 200

When each number is rounded to the nearest 100,000, the difference between them is 100,000

What could the two numbers be?

Find all the possible answers.

49,900 and 50,100

49,800 and 50,000

328,154 people buy tickets for a festival.

Tickets are printed in batches of 10,000

How many batches of tickets should the organisers print?


33 batches

A, B and C are three different whole numbers.

- When the difference between A and B is rounded to the nearest 100, the answer is 700
- When the difference between B and C is rounded to the nearest 100, the answer is 400
- None of the numbers are multiples of 10

Find a possible set of values for A, B and C.

Compare answers with a partner.

Are your values of A, B and C in the same order greatest to smallest?

Are your differences smaller or greater?

A – B (or B – A) is between 650 and 749

B – C (or C –B) is between 350 and 449

multiple possible answers, e.g.

A = 1,199
B = 450
C = 1

A = 651
B = 1
C = 351