Autumn

Scheme of learning

Year 3

#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.

$$5 + 7$$

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

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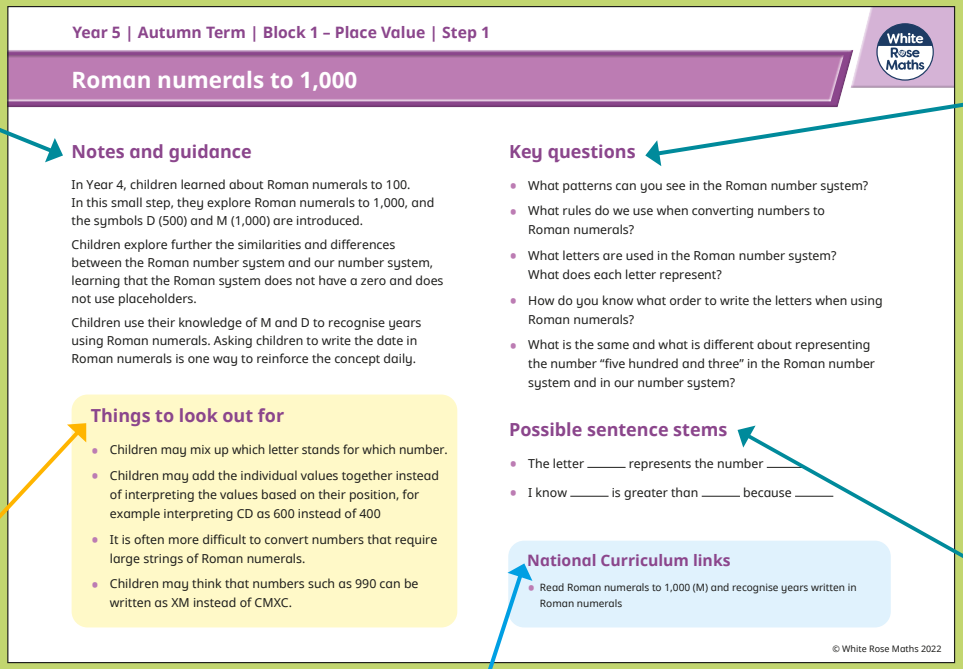
Teacher guidance

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

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.

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?

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.

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

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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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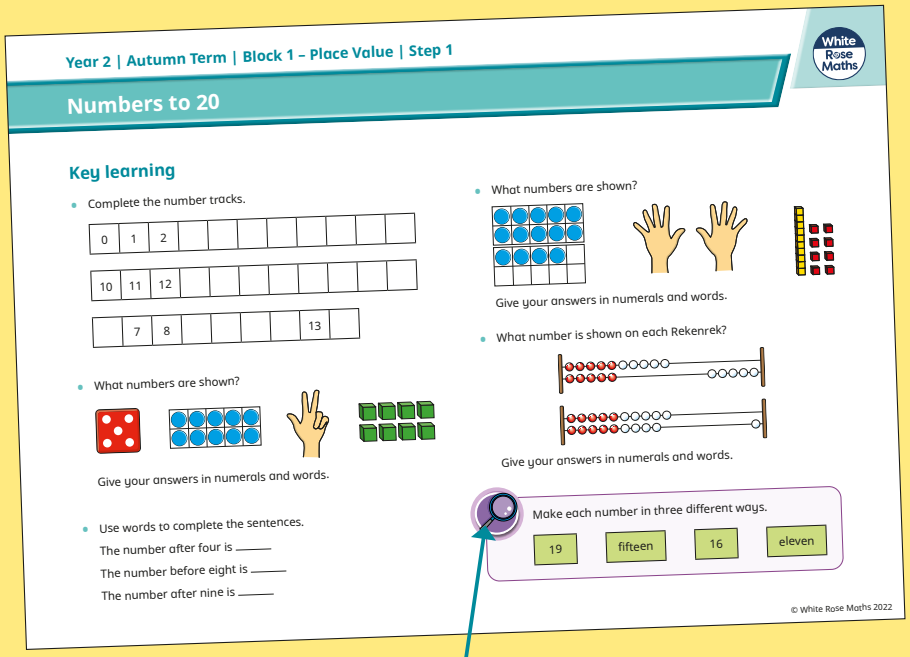
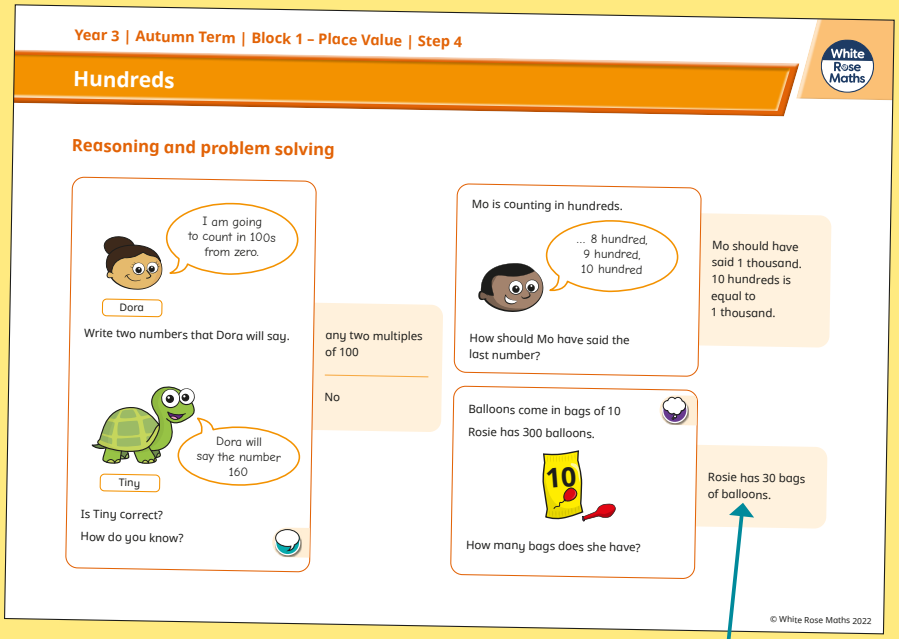
Teacher guidance

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

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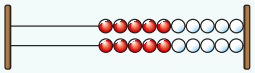
Activities and symbols

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.

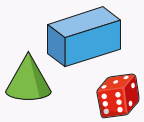
Give children a selection of buttons and ask them to sort the buttons in as many different ways as they can.

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.

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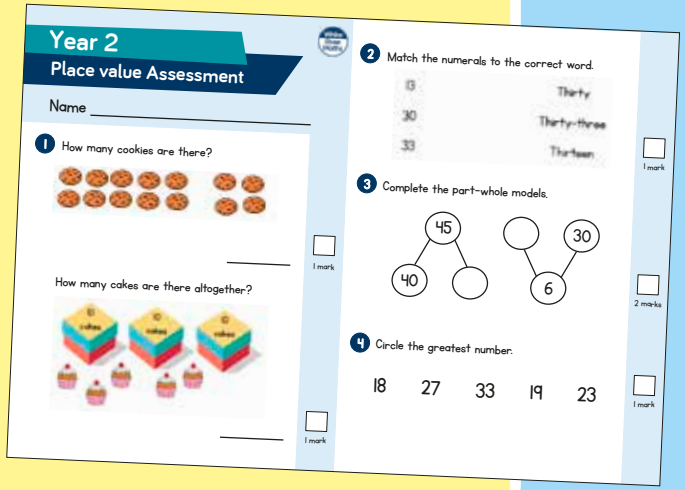
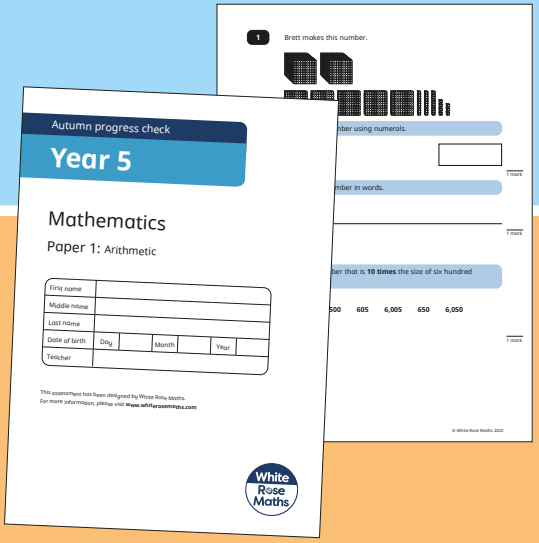
Free supporting materials

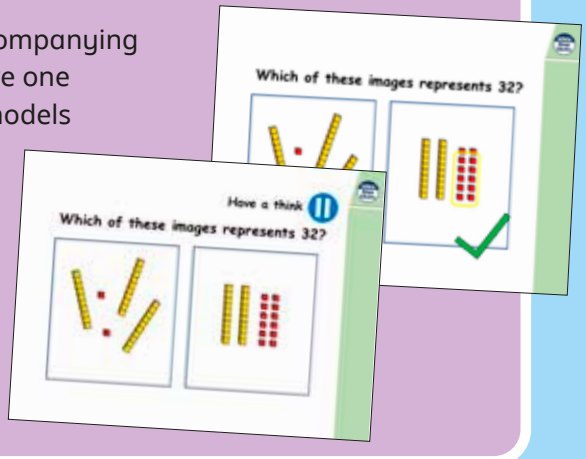
End-of-block assessments to check progress and identify gaps in knowledge and understanding.





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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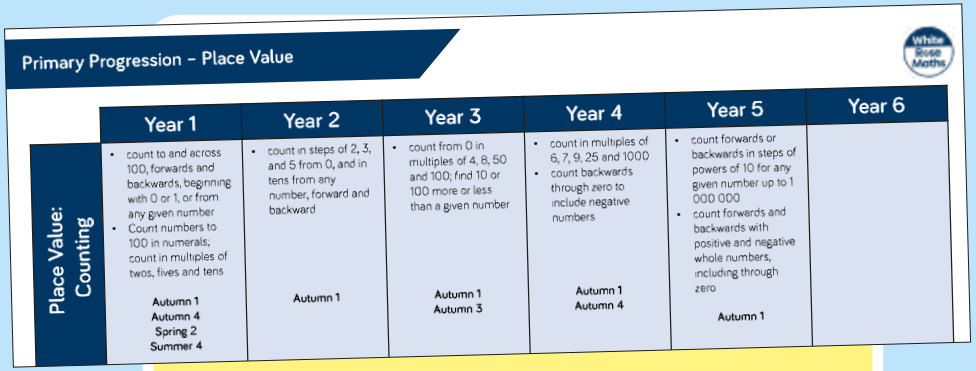
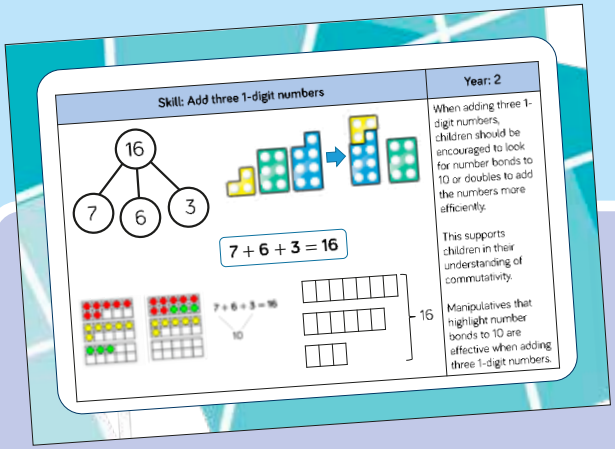
Free supporting materials



Primary Progression – Place Value

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Place Value: Counting	• count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number • Count numbers to 100 in numerals; count in multiples of twos, fives and tens Autumn 1 Autumn 4 Spring 2 Summer 4	• count in steps of 2, 3, and 5 from 0, and in tens from any number, forward and backward Autumn 1	• count from 0 in multiples of 4, 8, 50 and 100; find 10 or 100 more or less than a given number Autumn 1 Autumn 3	• count in multiples of 6, 7, 9, 25 and 1000 • count backwards through zero to include negative numbers Autumn 1 Autumn 4	• count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000 • count forwards and backwards with positive and negative whole numbers, including through zero Autumn 1	

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



Skill: Add three 1-digit numbers

Year: 2

16

7 6 3

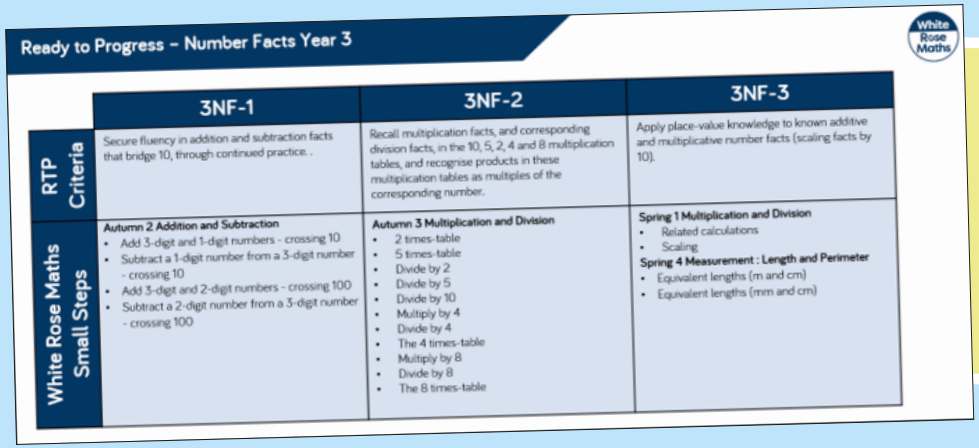
$7 + 6 + 3 = 16$

When adding three 1-digit numbers, children should be encouraged to look for number bonds to 10 or doubles to add the numbers more efficiently.

This supports children in their understanding of commutativity.

Manipulatives that highlight number bonds to 10 are effective when adding three 1-digit numbers.

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



Ready to Progress – Number Facts Year 3

	3NF-1	3NF-2	3NF-3
RTP Criteria	Secure fluency in addition and subtraction facts that bridge 10, through continued practice. .	Recall multiplication facts, and corresponding division facts, in the 10, 5, 2, 4 and 8 multiplication tables, and recognise products in these multiplication tables as multiples of the corresponding number.	Apply place-value knowledge to known additive and multiplicative number facts (scaling facts by 10).
White Rose Maths Small Steps	**Autumn 2 Addition and Subtraction** • Add 3-digit and 1-digit numbers - crossing 10 • Subtract a 1-digit number from a 3-digit number - crossing 10 • Add 3-digit and 2-digit numbers - crossing 100 • Subtract a 2-digit number from a 3-digit number - crossing 100	**Autumn 3 Multiplication and Division** • 2 times-table • 5 times-table • Divide by 2 • Divide by 5 • Divide by 10 • Multiply by 4 • Divide by 4 • The 4 times-table • Multiply by 8 • Divide by 8 • The 8 times-table	**Spring 1 Multiplication and Division** • Related calculations • Scaling **Spring 4 Measurement : Length and Perimeter** • Equivalent lengths (m and cm) • Equivalent lengths (mm and cm)

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

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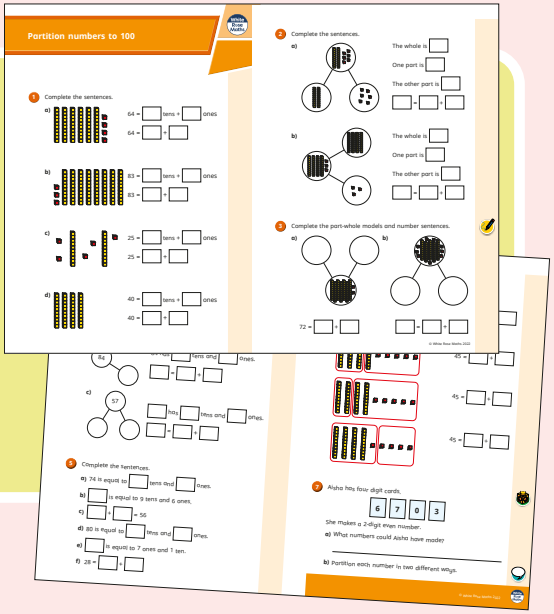
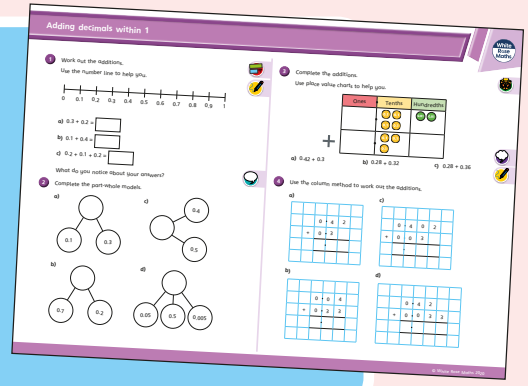
Premium supporting materials

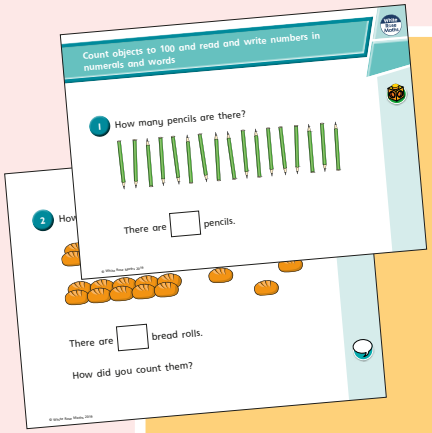
Worksheets to accompany every small step, providing relevant practice questions for each topic that will reinforce learning at every stage.



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

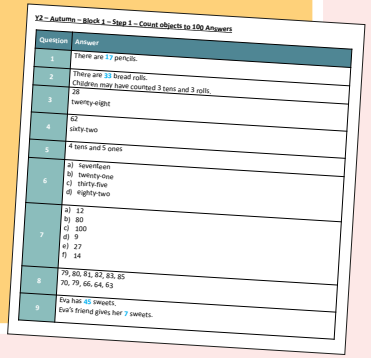


Also available as printed **workbooks**, per block.



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

Answers to all the worksheet questions.



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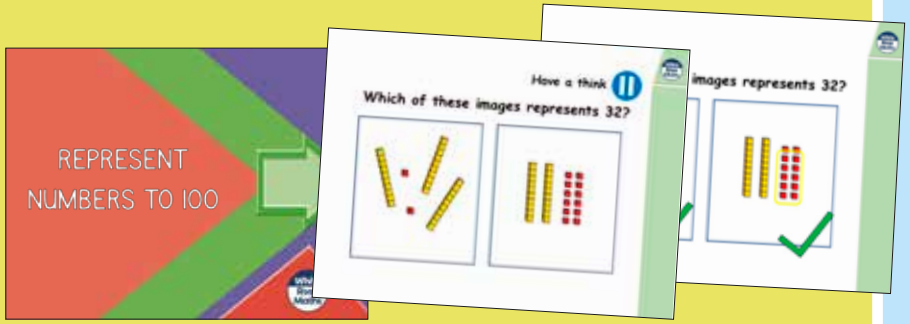
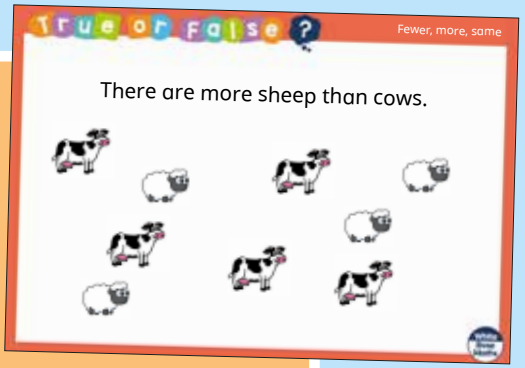
Premium supporting materials

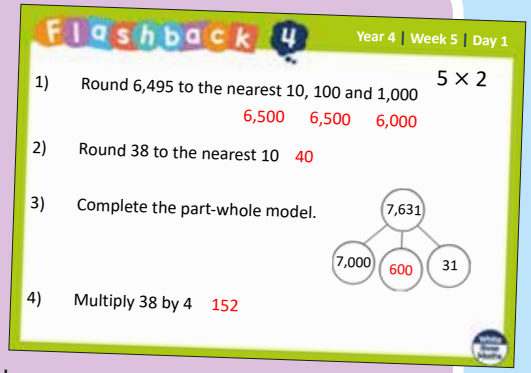
Teaching slides that mirror the content of our home learning videos for each step. These are fully animated and editable, so can be adapted to the needs of any class.

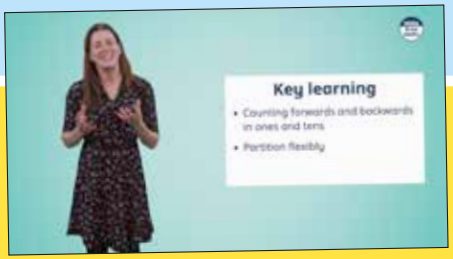


A **true or false** question for every small step in the scheme of learning. These can be used to support new learning or as another tool for revisiting knowledge at a later date.



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**			
Spring	Number **Multiplication and division B**			Measurement **Length and perimeter**			Number **Fractions A**			Measurement **Mass and capacity**		
Summer	Number **Fractions B**			Measurement **Money**			Measurement **Time**		Geometry **Shape**	**Statistics**		Consolidation

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Autumn Block 1

Place value

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Small steps

Step 1	Represent numbers to 100
Step 2	Partition numbers to 100
Step 3	Number line to 100
Step 4	Hundreds
Step 5	Represent numbers to 1,000
Step 6	Partition numbers to 1,000
Step 7	Flexible partitioning of numbers to 1,000
Step 8	Hundreds, tens and ones

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Small steps

Step 9	Find 1, 10 or 100 more or less
Step 10	Number line to 1,000
Step 11	Estimate on a number line to 1,000
Step 12	Compare numbers to 1,000
Step 13	Order numbers to 1,000
Step 14	Count in 50s

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Represent numbers to 100

Notes and guidance

Children have already represented numbers to 100 in Year 2. This small step provides the opportunity to revisit and consolidate their learning before moving on to numbers beyond 100

The main focus of this step is to ensure that children get a sense of the size of numbers to 100 and can see clearly the number of tens and ones each number is made up of. Children should be confident using a range of manipulatives, such as straws, a bead string and base 10, alongside their own drawings and jottings. Place value counters are not used in this particular small step, as they do not show the relative sizes of numbers, and children cannot see that 1 ten is made up of 10 ones.

Things to look out for

- Children may count 1 ten as 1 rather than 10
  Using bundles of straws is useful here as children can physically count out 10 ones and then bundle them to make 1 ten.
- When asked to draw, children can often draw too much detail. Ensure you give clear instructions, for example a line means 1 ten; a dot means 1 one.
- Children may not recognise that when there are 10 or more ones they need to make an exchange.

Key questions

- How have the beads been grouped? How does this help you to count?
- Is it quicker to count in ones or tens?
- How many tens do you have? How many ones do you have?
- How many ones make 1 ten?
- How else can you show this number?

Possible sentence stems

- There are _____ tens and _____ ones.
  The number is _____
- The _____ represents _____ groups of ten.
  The _____ represents _____ extra ones.

National Curriculum links

- Identify, represent and estimate numbers using different representations

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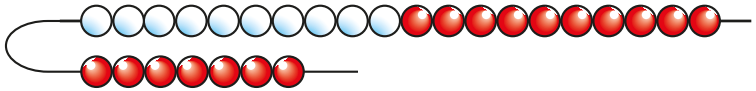
Represent numbers to 100

Key learning

- Here is part of a bead string.



Complete the sentences.

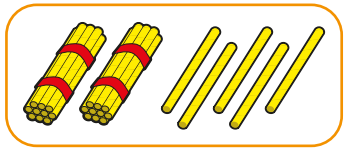
There are _____ tens.

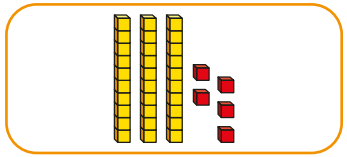
There are _____ ones.

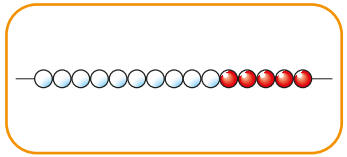
The number is _____

Represent 45 on a bead string and complete the same sentences.

- Match the pictures to the numbers.







1 ten and 5 ones

thirty-five

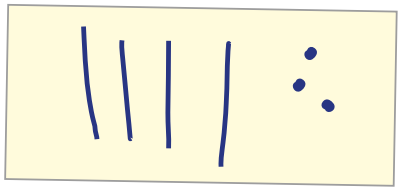
25

- Complete the sentences for the number 67

There are _____ tens.

There are _____ ones.

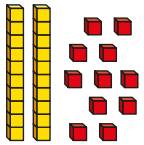
- Dora has used lines and dots to draw the number 43

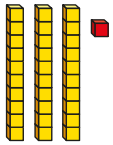


Use lines and dots to draw each number.

26	52	74

- These two numbers are the same.





Explain why.

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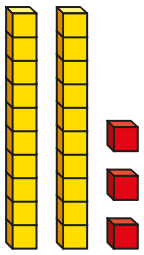
Represent numbers to 100

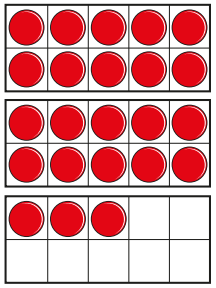
Reasoning and problem solving

Which picture does **not** show 23?

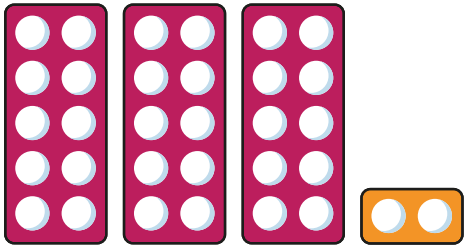
A



B



C



How do you know?

C does not show 23, it shows 32

Here are three digit cards.

7	0	2

List the 2-digit numbers that can be made using these digit cards.

20, 27, 70, 72

What is the greatest 2-digit number you can make?

72

What is the smallest 2-digit number you can make?

20

Why can the zero not be used for the number of tens?

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Partition numbers to 100

Notes and guidance

In this small step, children learn what each digit represents when partitioning a number. Concrete resources are useful to help children physically explore this, as they can break a number apart and put it back together. Part-whole models can be used alongside these resources, to represent the number and its parts.

It is important that children can partition numbers into tens and ones, for example 58 has 5 tens and 8 ones. They should be able to write this as an addition sentence such as 58 = 50 + 8

Children who are confident with partitioning in this way could begin to partition flexibly, for example 58 is made up of 5 tens and 8 ones, or 4 tens and 18 ones, or 2 tens and 38 ones, and so on.

Things to look out for

- When representing a 2-digit number, children may not understand that tens and ones have a different value. For example, they may use 5 ones to represent 50 instead of using 5 tens.
- Children may complete a part-whole model or number sentence incorrectly, forgetting the zero that is needed to represent tens, for example 58 = 5 + 8 instead of 58 = 50 + 8
- Representations may be interpreted incorrectly, for example 40 + 2 = 402

Key questions

- Which part do you know? How can you use the whole and this part to work out the missing part?
- How can you use base 10 or draw a picture to help you partition?
- How can you complete the part-whole model in a different way?

Possible sentence stems

- There are _____ tens and _____ ones.

  The number is _____
- The whole is _____

  One part is _____. The other part is _____
- _____ tens and _____ ones is the same as _____ tens and _____ ones.

National Curriculum links

- Recognise the place value of each digit in a 3-digit number (hundreds, tens, ones)

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Partition numbers to 100

Key learning

- Here is a part-whole model.

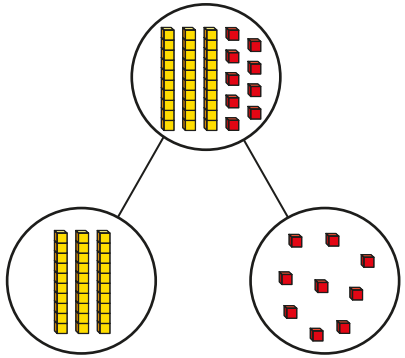
  Complete the sentences.

  The whole is _____

  One part is _____

  The other part is _____

  _____ = _____ + _____



- Draw base 10 in a part-whole model to show the number.

The whole is 42 One part is 40. The other part is 2

  Complete the number sentence.

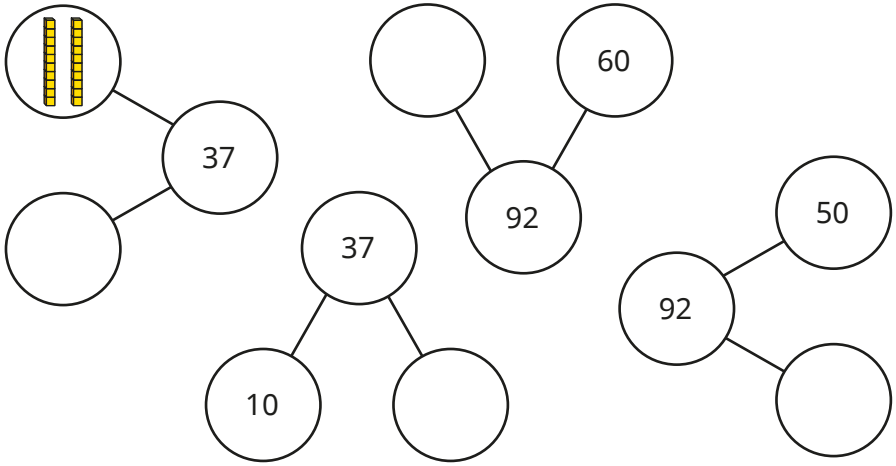
  _____ = _____ + _____

- Match the partitions to the numbers.

20 + 19	10 + 4	40 + 0	90 + 3
40	14	93	39

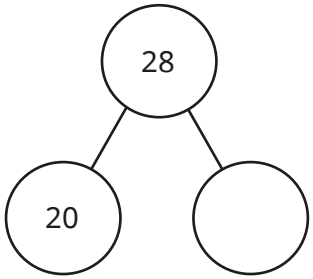
- Complete the sentences.
  - 67 has _____ tens and _____ ones. 67 = _____ + _____
  - 91 has _____ tens and _____ ones. 91 = _____ + _____

- Complete the part-whole models.



- Complete the part-whole model.

  Write four number sentences for the part-whole model.



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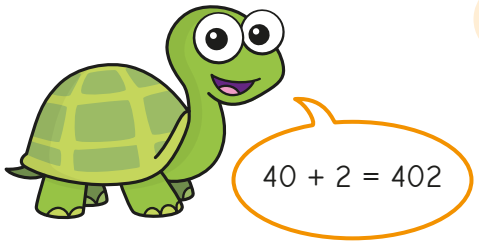
Partition numbers to 100

Reasoning and problem solving



Explain the mistake Tiny has made.

Use base 10 to show the correct answer.

40 + 2 = 42

Fill in the missing numbers.

1 ten + 3 ones = 13

2 tens + _____ ones = 23

3 tens + 3 ones = _____

_____ tens + 3 ones = 43

Can you see a pattern?

What will the next number sentence be?

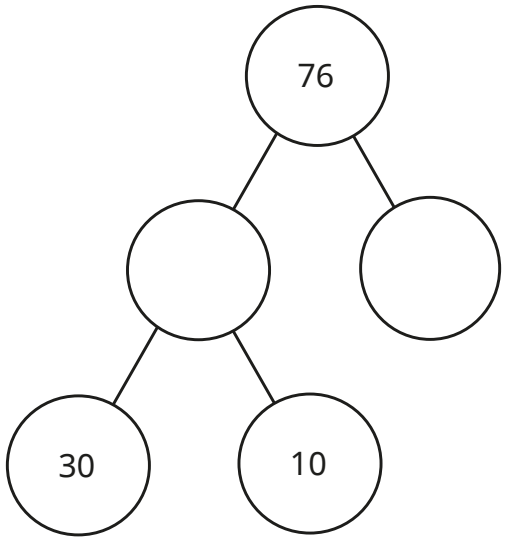
3 ones

33

4 tens

5 tens + 3 ones = 53

Complete the part-whole model.



40, 36

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Number line to 100

Notes and guidance

In this small step, children revisit learning from Year 2, looking at the number line to 100

It is important that children explore a variety of examples within 100, including number lines that do not start from zero and number lines with increments other than 1 or 10

Children identify or estimate the position of a given number on a number line, understanding why they can accurately position numbers that lie exactly on a division, but the position of numbers within an interval can only be estimated.

When children are identifying and/or estimating the position of a number on a number line, encourage them to label the divisions to support their thinking.

Things to look out for

- Children may assume that all number lines count in 1s or 10s and hence incorrectly label the divisions.
- Children may count the number of divisions, rather than the intervals.
- Children may incorrectly count the number of intervals and therefore label the positions of numbers incorrectly.

Key questions

- What is the start point? What is the end point?
- How many intervals are there? What is each interval worth?
- What is the number line counting up in? How do you know?
- Where would _____ be on the number line? How do you know?
- Why can you only estimate the position of _____ on the number line?

Possible sentence stems

- The start point is _____ and the end point is _____
- There are _____ intervals on the number line.
- Each interval is worth _____
- The number line is counting up in _____

National Curriculum links

- Count from zero in multiples of 4, 8, 50 and 100; find 10 or 100 more or less than a given number
- Identify, represent and estimate numbers using different representations

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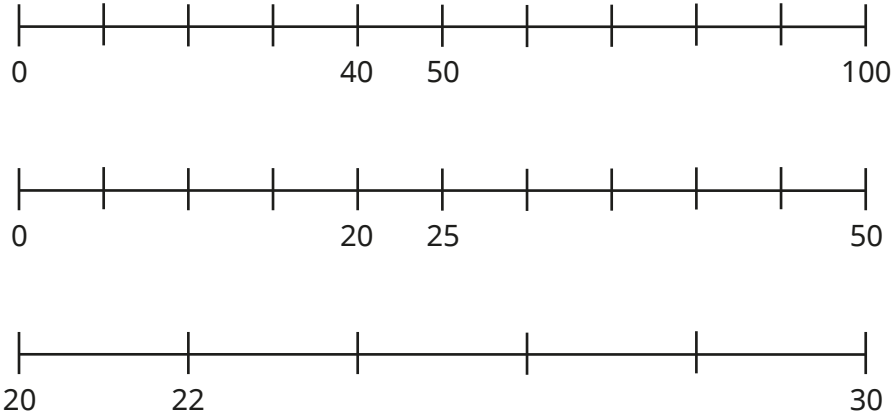
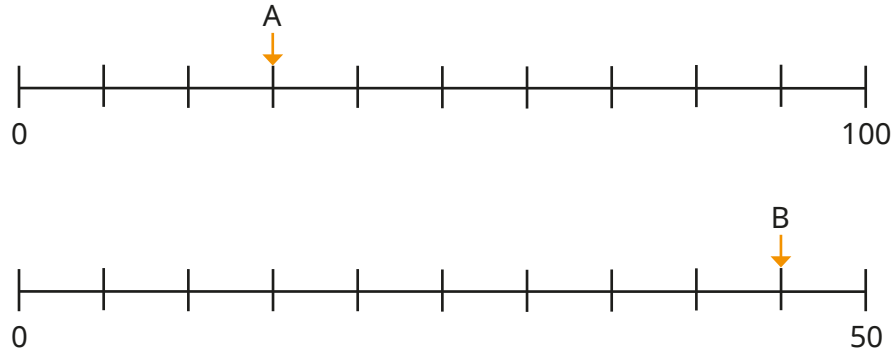
Number line to 100

Key learning

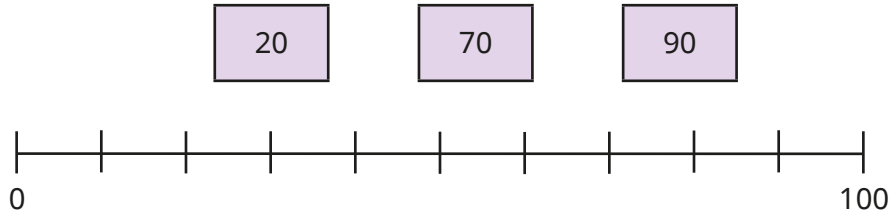
- Complete the number lines.



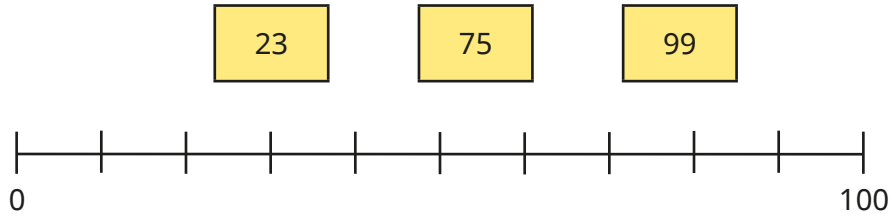
- What numbers are the arrows pointing to?



- Draw an arrow to show where each number belongs on the number line.

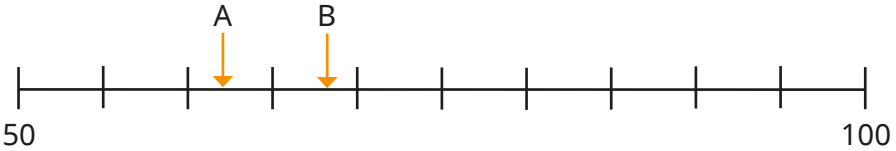


- Draw an arrow to estimate where each number belongs on the number line.



Why can you only estimate where each number belongs?

- Estimate the numbers the arrows are pointing to.



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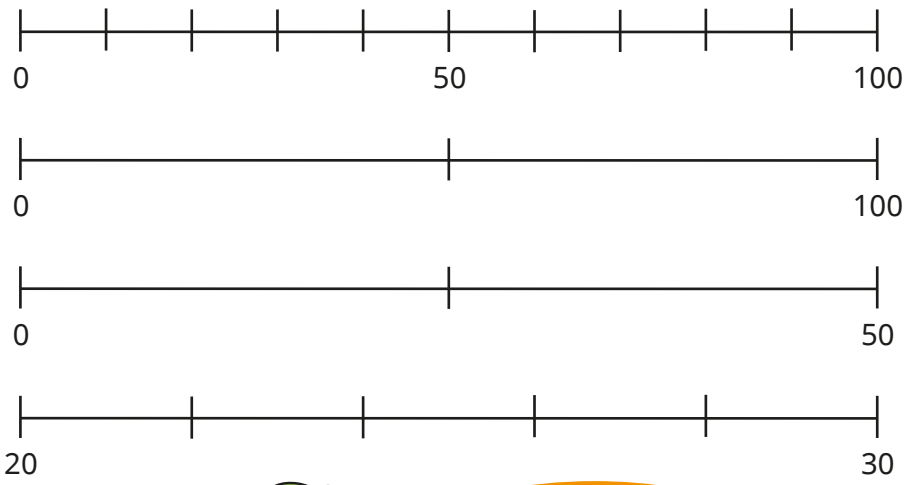
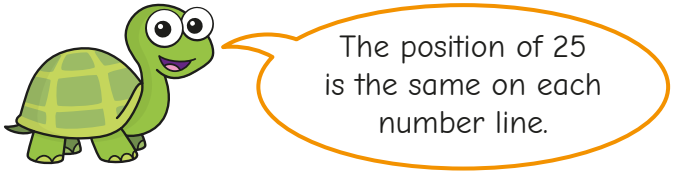
Number line to 100

Reasoning and problem solving



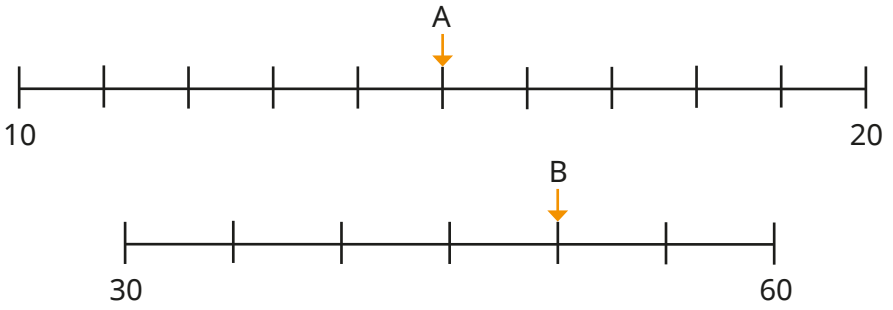


Do you agree with Tiny?

Explain your answer.

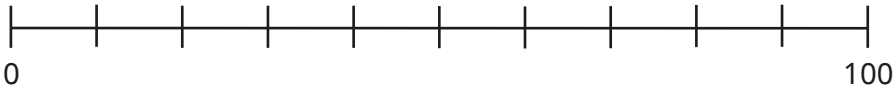
No

What numbers are the arrows pointing to?

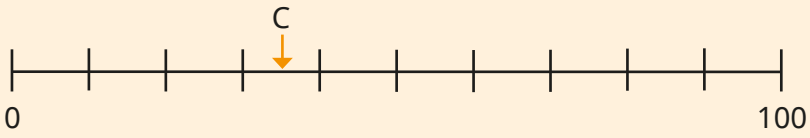


A + B + C = 100

Draw an arrow to estimate where C belongs on the number line.



A = 15 B = 50



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Hundreds

Notes and guidance

In Year 2, and previous small steps, children have counted in tens within 100. This small step provides the opportunity to explore 100 explicitly for the first time. Children should be able to confidently count in 100s before looking at the structure of 100

By the end of this small step, children should understand that 10 tens are equivalent to 1 hundred, and that 100 is 10 times the size of 10. They will then use this knowledge to explore other multiples of 100 within 1,000

By unitising the hundred, children should be able to state the number of tens that make up any 3-digit multiple of 100. Base 10 can be used to support understanding, allowing children to see the tens making up each hundred.

Things to look out for

- Children may not recognise or distinguish between a 10 piece and a 100 piece in base 10, and count each piece as "1"
- Children may not be using the most efficient method of counting.
- Children may not be using placeholders when writing numbers in numerals.

Key questions

- When counting in 10s, what number comes after 90?
- If you count from zero in 100s, will you say 40?
- When counting in 100s, what comes after 500?
  How do you know?
- How many tens are there in 100?
- If there are 10 tens in 100, how many tens are there in 200?
- How does the base 10 show that 100 is 10 times the size of 10?

Possible sentence stems

- There are _____ tens in 100 and _____ hundreds in _____

  This means there are _____ tens in _____

National Curriculum links

- Count from zero in multiples of 4, 8, 50 and 100
- Identify, represent and estimate numbers using different representations
- Read and write numbers up to 1,000 in numerals and words

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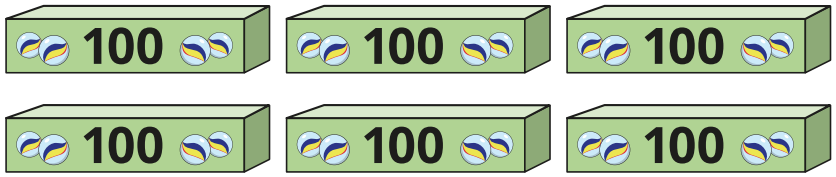
Hundreds

Key learning

- How many marbles are there?

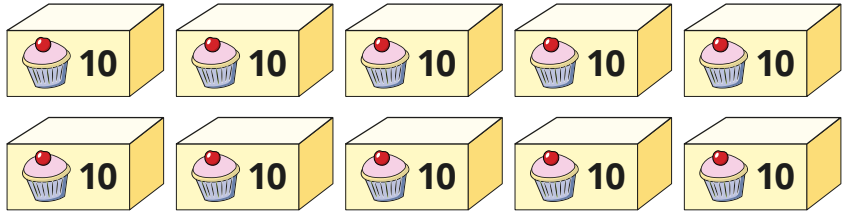


Write your answer in numerals and in words.

- Complete the number track.

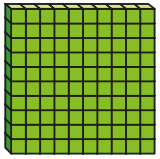
		200	300		500			800	

- How many cupcakes are there?

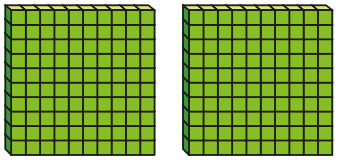


Write your answer in numerals and in words.

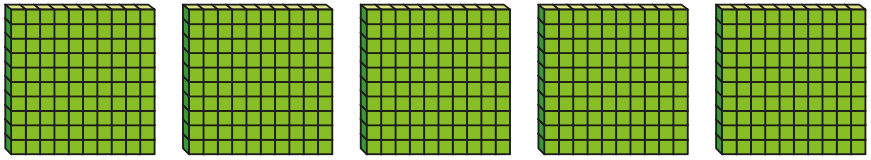
- How many tens are there in 100?



- How many tens are there in 200?



- Complete the sentences to describe the number.



There are _____ tens in 100

There are _____ hundreds in 500

There are _____ tens in 500

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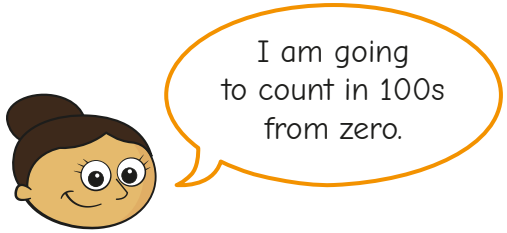
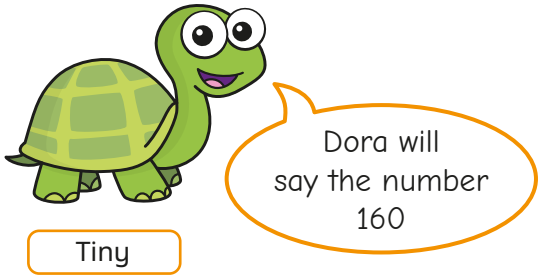
Hundreds

Reasoning and problem solving



Write two numbers that Dora will say.

any two multiples of 100

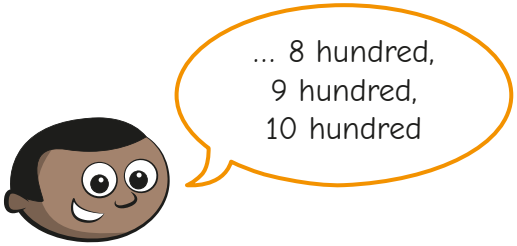


Is Tiny correct?

How do you know?

No

Mo is counting in hundreds.

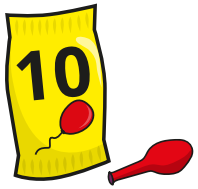


How should Mo have said the last number?

Mo should have said 1 thousand. 10 hundreds is equal to 1 thousand.

Balloons come in bags of 10

Rosie has 300 balloons.



How many bags does she have?

Rosie has 30 bags of balloons.

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Represent numbers to 1,000

Notes and guidance

In this small step, children build on their learning from Year 2, and the earlier steps in this block, to represent numbers to 1,000

They use base 10 as the main concrete representation, along with a variety of pictorial representations. Using base 10 helps children to see that hundreds are 10 times the size of tens, in the same way that tens are 10 times the size of ones. Building numbers in a variety of ways emphasises these relationships.

Children need to see numbers with zeros in different columns and be able to represent these using both concrete and pictorial representations. The idea of a placeholder is explicitly addressed in the next small step.

Things to look out for

- Children may write numbers incorrectly, for example writing 423 as 400203
- Children may not understand the value of each part of a number, for example confusing 240 and 204
- Children may miscount the number of hundreds, tens and ones in a number.
- Children may have difficulty exchanging when representations show more than ten of one part of a number.

Key questions

- What is the value of each of the base 10 pieces?
- How many hundreds are in the number? How many tens are in the number? How many ones are in the number?
- Why do you need to make an exchange when you have 12 tens?
- Does the order in which you build the number matter?
- How else can you represent the number?

Possible sentence stems

- There are _____ hundreds, _____ tens and _____ ones.
  The number is _____
- _____ is made up of _____ hundreds, _____ tens and _____ ones.

National Curriculum links

- Read and write numbers up to 1,000 in numerals and words
- Identify, represent and estimate numbers using different representations

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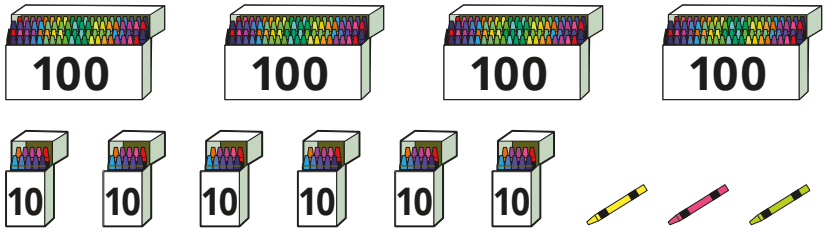
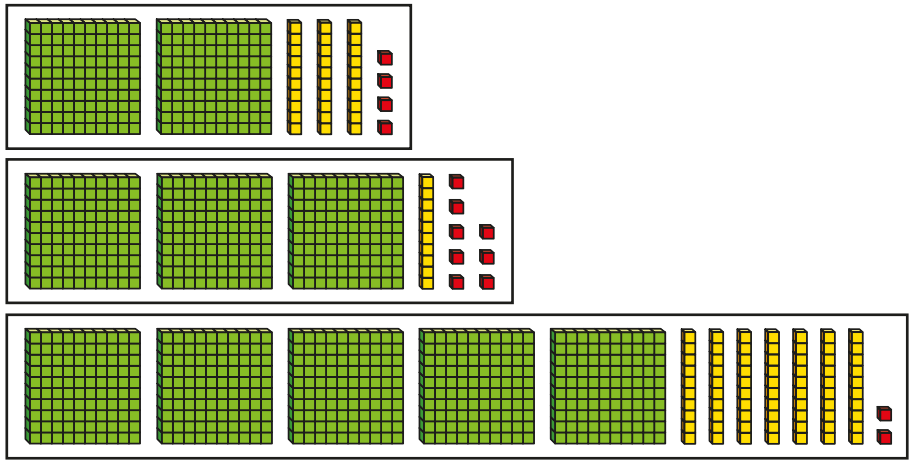
Represent numbers to 1,000

Key learning

- How many crayons are there?



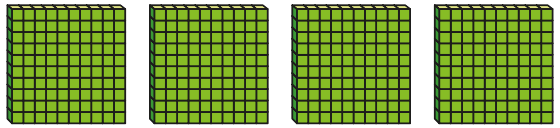
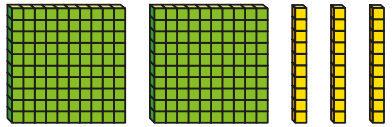
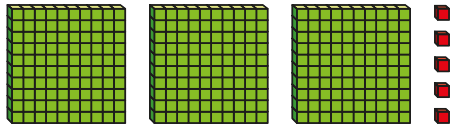
- What numbers are shown?



- Use base 10 to show each number.

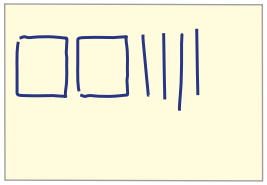
700	120	407	999

- Complete the table.

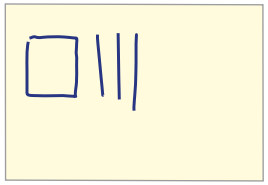
Base 10	Number
	
	
	

- Alex is drawing numbers.
  Complete each of her drawings.

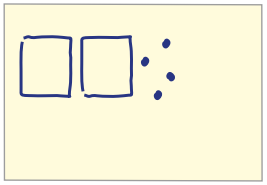
246



390



706



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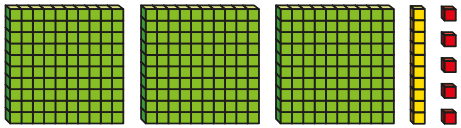
Represent numbers to 1,000

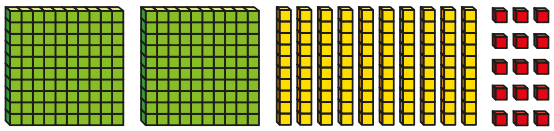
Reasoning and problem solving

Who has made the number 315?

Dora



Mo

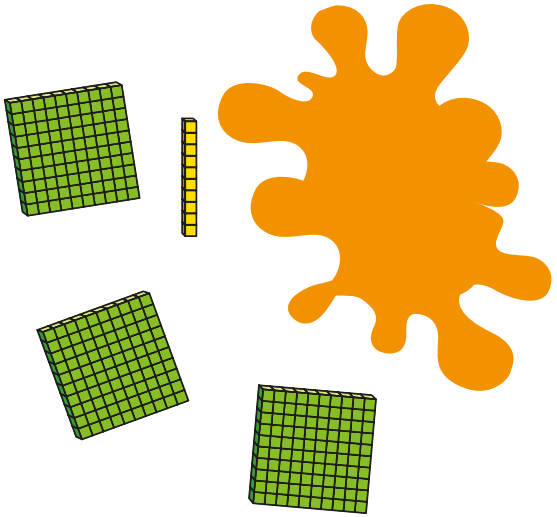


Explain how you know.

Dora and Mo have both made the number 315

Teddy has used base 10 to make the number 420

Some of the base 10 pieces are covered up.



Work out the amount that is covered up.

Find some different ways you can make the missing amount using base 10

110

multiple possible answers, e.g.

1 hundred and 1 ten

11 tens

10 tens and 10 ones

50 ones and 6 tens

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Partition numbers to 1,000

Notes and guidance

In this small step, children partition numbers to 1,000 into hundreds, tens and ones.

Children represent numbers in a part-whole model and identify missing parts and wholes. They write numbers in expanded form, using a part-whole model as support where needed, and identify the number of hundreds, tens and ones in a 3-digit number. Examples that include zero as a placeholder should be explicitly looked at to build on learning from the previous step. Children should be able to identify the value of any given digit in a 3-digit number.

Base 10 can be used to support children's understanding.

Things to look out for

- Children may not correctly assign place value to each digit of a number, for example 423 = 4 + 2 + 3
- Where the parts of a part-whole model are not given in value order, children may incorrectly interpret the number.
- Children may be confused by the language relating to place value, for example saying that 423 has 20 tens rather than 2 tens.
- Children may omit zeros needed as placeholders.

Key questions

- How many hundreds/tens/ones are there in 465?
- How do you write a number that has zero tens?
- How do you write a number that has zero ones?
- What number is equal to 300 + 70 + 9?
- What is the value of the missing part? How do you know?
- What is the value of the digit 6 in 465?

Possible sentence stems

- There are _____ hundreds, _____ tens and _____ ones.
  The number is _____
- _____ has _____ hundreds, _____ tens and _____ ones.
  _____ = _____ + _____ + _____

National Curriculum links

- Read and write numbers up to 1,000 in numerals and in words
- Recognise the place value of each digit in a 3-digit number (hundreds, tens, ones)

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Partition numbers to 1,000

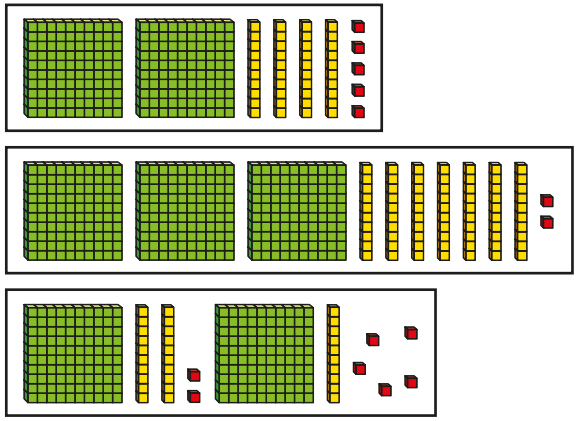
Key learning

- Complete the sentences to describe each number.

  There are _____ hundreds, _____ tens and _____ ones.

  The number is _____

  _____ = _____ + _____ + _____



- Use base 10 to make each number.

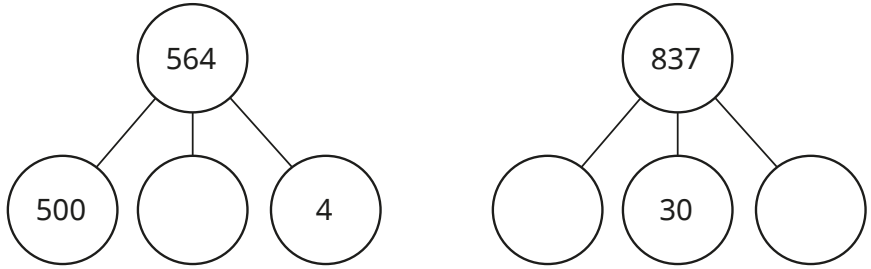
259	340	506	400

  Complete the sentences to describe each number.

  There are _____ hundreds, _____ tens and _____ ones.

  _____ = _____ + _____ + _____

- Complete the part-whole models.



- Complete the number sentences.
  - 847 = 800 + 40 + _____
  - 615 = _____ + 10 + 5
  - 324 = 300 + _____ + _____
  - 560 = 500 + _____
  - _____ = 400 + 70 + 9
  - _____ = 300 + 2

- What is the value of the hundreds digit in 864?

  What is the value of the ones digit in 72?

  What is the value of the tens digit in 530?

  Write in numerals the number that has 7 hundreds, 2 tens and 1 one.

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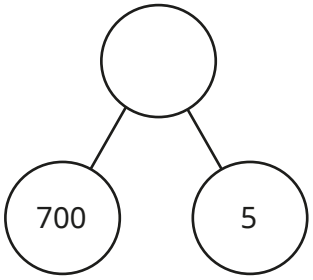
Partition numbers to 1,000

Reasoning and problem solving

Tiny is completing a part-whole model.

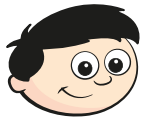


Explain the mistake that Tiny has made.

What is the whole?

705

Dexter has made a 3-digit number using base 10



What number could Dexter have made?

Compare answers with a partner.

152, 251, 350

Use the digit cards to make a 3-digit number.

3	7	8

Partition your number into hundreds, tens and ones.

Compare answers with a partner.

How many numbers can you find?

various possible answers, e.g. 378 = 300 + 70 + 8

378 has 3 hundreds, 7 tens and 8 ones

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Flexible partitioning of numbers to 1,000

Notes and guidance

In the previous step, children partitioned numbers up to 1,000 in the standard way, considering how many hundreds, tens and ones were in each number. In this small step, children build on this understanding and begin to partition numbers flexibly.

Children learn that a number can be broken apart, or partitioned, in a variety of different ways. Base 10 and part-whole models are particularly useful here, as children can experiment with different ways of partitioning and record their results. Challenge children to partition the same number in two, three, four and five parts.

Being able to flexibly partition a number will support children later in the year when performing calculations that require an exchange.

Things to look out for

- Without the support of concrete resources, children can find this concept difficult. Ensure children have access to concrete resources for support in working out and checking answers.
- Children may be confident experimenting with different amounts of full hundreds, tens and ones such as 452 = 300 + 100 + 40 + 10 + 2, but struggle when partitioning numbers further such as 452 = 340 + 110 + 2

Key questions

- Can you partition the number in more than one way?
- How do you write a number that has zero tens?
- How do you write a number that has zero ones?
- Explain why 300 = 200 + 100
- Is 200 + 100 + 50 + 16 equal to 300 + 60 + 6? How do you know?
- What number is made of 3 hundreds and 15 tens?

Possible sentence stems

- _____ hundreds can be partitioned into _____ hundreds and _____ hundreds.
- _____ tens can be partitioned into _____ tens and _____ tens.
- _____ can be partitioned into _____, _____ and _____

  _____ = _____ + _____ + _____

National Curriculum links

- Read and write numbers up to 1,000 in numerals and in words
- Recognise the place value of each digit in a 3-digit number (hundreds, tens, ones)

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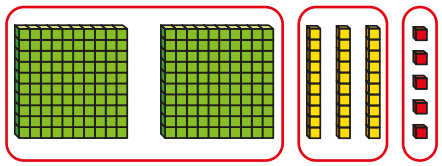
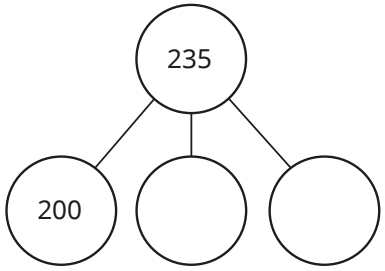
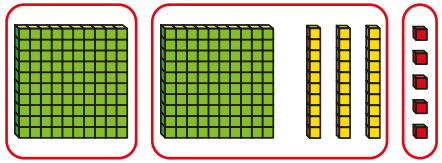
Flexible partitioning of numbers to 1,000

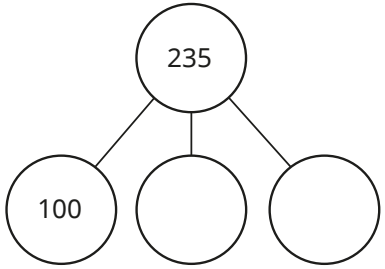
Key learning

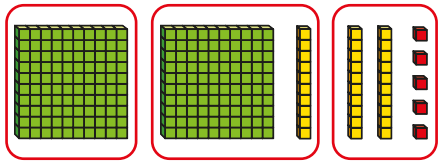
- Complete the part-whole models to match each picture.

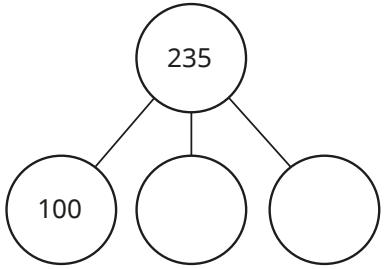










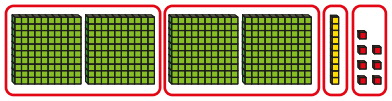


Is it possible to partition 235 in any other ways?

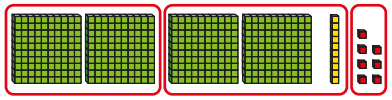
Is it possible to partition 235 into more than three parts?

- Here is the number 417 partitioned in three different ways.

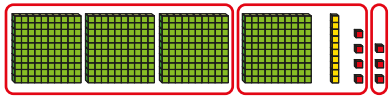
  Draw a part-whole model and complete the number sentence for each.



417 = ____ + ____ + ____ + ____



417 = ____ + ____ + ____



417 = ____ + ____ + ____

  Find another way to partition 417

  Draw a part-whole model and write a number sentence for your partition.

- Complete the number sentences.
  - 625 = 500 + _____ + 20 + 5
  - 430 = 100 + _____ + 30
  - 701 = _____ + 201
  - 701 = 301 + _____
  - 937 = 900 + 20 + _____
  - 259 = 100 + _____ + 39

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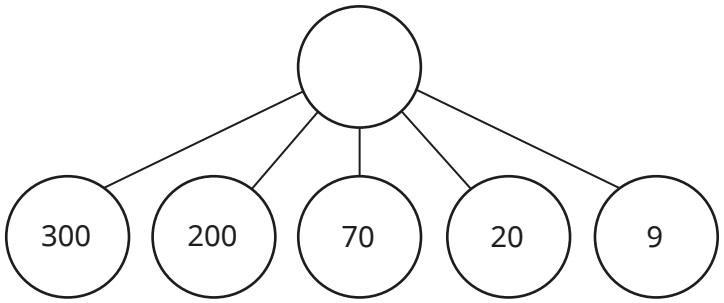
Flexible partitioning of numbers to 1,000

Reasoning and problem solving

What is the whole?



599

Partition 367 in five different ways.

Compare answers with a partner.

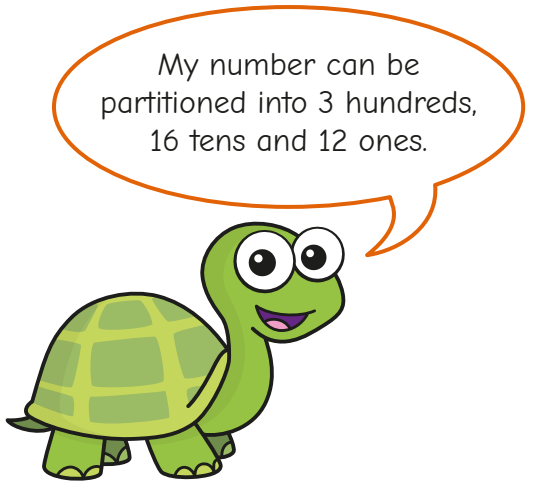
What is the same? What is different?

multiple possible answers, e.g.

200 + 160 + 7

220 + 130 + 17

Tiny is thinking of a number.



Complete the number sentence to partition Tiny's number in a different way.

_____ = _____ + _____ + _____+ _____

multiple possible answers, e.g.

472 = 100 + 200 + 170 + 2

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Hundreds, tens and ones

Notes and guidance

In this small step, children look at the structure of a number by considering how many hundreds, tens and ones it is made up of. As part of this, they are introduced to place value counters for the first time. Children should be encouraged to consider the similarities and differences between more familiar concrete resources, such as base 10, and place value counters.

By describing numbers such as 253 as being made up of 2 hundred counters, 5 ten counters and 3 one counters, children can more easily begin to think of this as 2 hundreds, 5 tens and 3 ones.

This is the first time children will see a place value chart that has a hundreds column, so this will need formally introducing.

Things to look out for

- When working with place value counters, the fact that the physical size of the object does not reflect its value may cause some difficulties.
- Children may place counters in the wrong columns of a place value chart.
- Children may think that plain counters cannot be used to represent a number in a place value chart because they do not have a value.

Key questions

- What is the same about representing a number using base 10 and using place value counters? What is different?
- How do you know the value of the counter?
- How do you know which column to place the counter in?
- How many hundreds, tens and ones is _____ made up of?
- How can you use plain counters to represent a number in a place value chart?

Possible sentence stems

- _____ can be made using _____ hundred counters, _____ ten counters and _____ one counters.
- _____ is made up of _____ hundreds, _____ tens and _____ones.

National Curriculum links

- Read and write numbers up to 1,000 in numerals and in words
- Recognise the place value of each digit in a 3-digit number (hundreds, tens, ones)

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Hundreds, tens and ones

Key learning

- Use base 10 to make 235

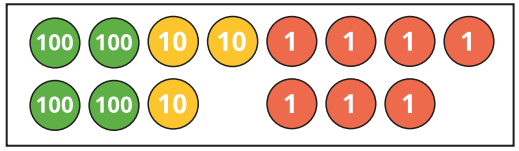
  Use place value counters to make 235

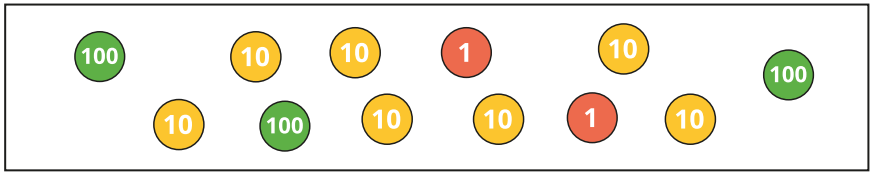
  What is the same? What is different?

  How many pieces of base 10 did you use?

  How many counters did you use?

- What numbers are shown?

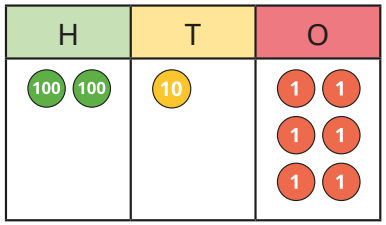


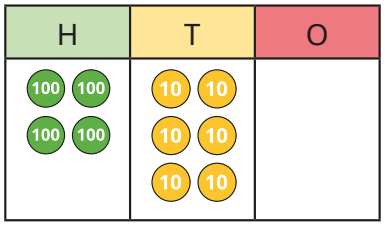


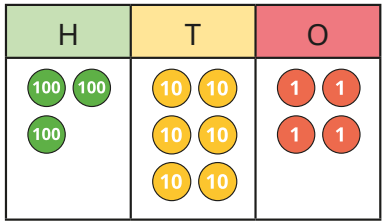
- Make the numbers using place value counters.

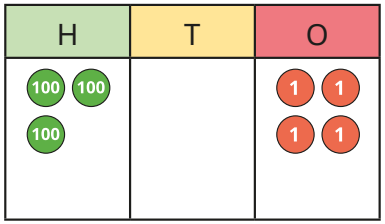
251	316	250	306	470

- What numbers are shown?









How many hundreds are there in each number?

How many tens are there in each number?

How many ones are there in each number?

- Use a place value chart to help you describe each number.

243	615	907	840

_____ is made up of _____ hundreds, _____ tens and _____ ones.

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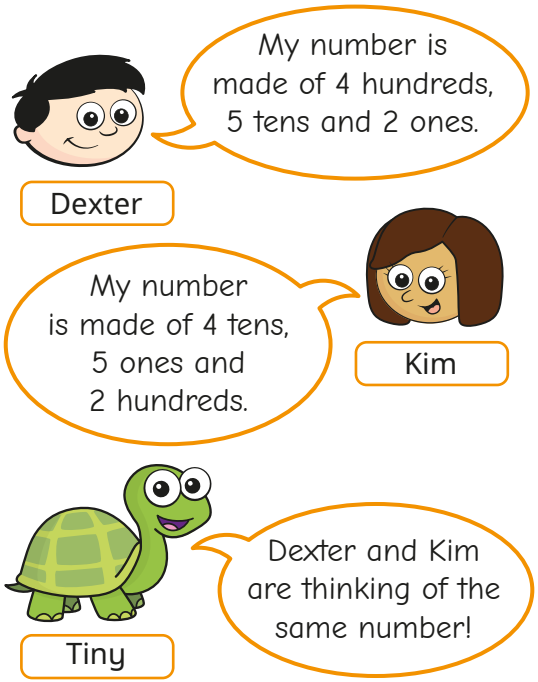
Hundreds, tens and ones

Reasoning and problem solving

Dexter and Kim are each thinking of a number.



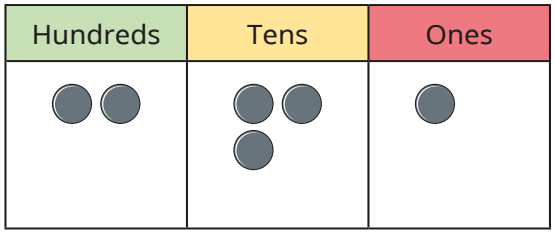
Explain the mistake Tiny has made.

What numbers are Dexter and Kim thinking of?

Tiny has not noticed the parts are in a different order.

Dexter: 452

Kim: 245



What number is represented in the place value chart?

How many hundreds, tens and ones are there?

What other numbers can be made using exactly six counters?

How many hundreds, tens and ones are there in each number?

231

2 hundreds, 3 tens and 1 one

multiple possible answers, e.g.

6, 42, 150, 141, 132, 123, 114, 105, 240, 222, 213, 330

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Find 1, 10 or 100 more or less

Notes and guidance

In Year 2, children found 1 more and 1 less than a given number. In this small step, they find 1, 10 or 100 more or less than a given number.

The use of concrete resources supports understanding, as children can see "more" or "less" as physically adding or removing pieces of equipment. Take this opportunity to revisit place value counters and charts that were introduced earlier in the block, in order for children to recognise the effect that finding 1, 10 or 100 more or less has on this representation.

Things to look out for

- Children may struggle when the result of finding 1, 10 or 100 more or less crosses a boundary within the number. For example, 10 more than 297 is 307. The concept of an exchange should be reinforced here.
- In questions such as "10 more than _____ is 297", children may find 10 more than 297
- When calculating 1, 10 and 100 more or less than a number, children may not refer to the original starting number and instead find 1 more, then 10 more than the result and so on.

Key questions

- How can you show this using base 10?
- How can you show this using a place value chart?
- When finding 1/10/100 more/less, which place value columns does this effect?
- Which digit(s) changes when you find 10 more?
- What is the same and what is different about finding 1/10/100 more and 1/10/100 less?

Possible sentence stems

- _____ more/less than _____ is _____
- _____ is _____ more/less than _____
- When finding _____ more/less than a number, the _____ digit(s) changes.

National Curriculum links

- Count from zero in multiples of 4, 8, 50 and 100; find 10 or 100 more or less than a given number
- Recognise the place value of each digit in a 3-digit number (hundreds, tens, ones)

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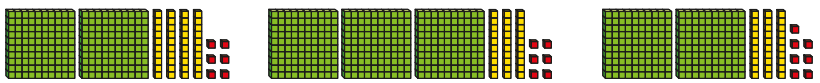
Find 1, 10 or 100 more or less

Key learning

- Here are three numbers shown in base 10

A **B** **C**



Which picture shows 1 more than 236?

What is 1 more than 236?

Which picture shows 10 more than 236?

What is 10 more than 236?

Which picture shows 100 more than 236?

What is 100 more than 236?

Explain your answers.

- The place value chart shows the number 425

H	T	O
100 100 100 100	10 10	1 1 1 1 1

What is 1 less than 425?

What is 10 less than 425?

What is 100 less than 425?

- Here are three numbers.

550 724 302

Find 10 more and 10 less than each number.

Find 100 more and 100 less than each number.

Which numbers were the hardest to find?

- Complete the tables.

10 less	Number	10 more

100 less	Number	100 more
100 100 10 10 1		100 100 100 10 10 1
	100 1	

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Find 1, 10 or 100 more or less

Reasoning and problem solving

Jack is thinking of a number.

10 more than my number is equal to 100 less than 320

What is Jack's number?

Explain your thinking.

210

One counter has fallen off the place value chart.

Hundreds	Tens	Ones
● ● ●		●

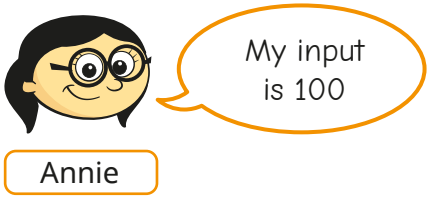
What could the number have been?

401

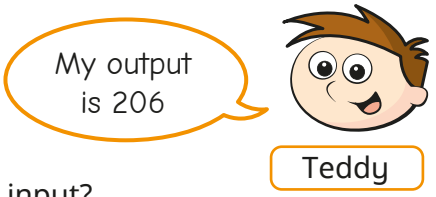
311

302

Annie and Teddy are using a function machine.



What is Annie's output?



What is Teddy's input?

11

295

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Number line to 1,000

Notes and guidance

In this small step, children build on their understanding of number lines and focus on using the number line to 1,000

Children read and interpret exact values positioned along the number line. There is no need at this stage to estimate the position or value of numbers on a number line, as this will be covered in the next small step.

Children are exposed to a variety of number lines, both to and within 1,000 and with different start and end point values, and can work confidently with these. Remind children of the benefit of always starting by labelling the divisions on their number line.

Things to look out for

- Children may assume that all number lines count in 1s, 10s or 100s and hence incorrectly label the divisions.
- Children may count the number of divisions, rather than the intervals.
- Children may incorrectly count the number of intervals and therefore label the positions of numbers incorrectly.
- Children may just look at the end point of the number line rather than both the start and end to find the difference.

Key questions

- What is the start point? What is the end point?
- How many intervals are there? What is each interval worth?
- What is the number line counting up in? How do you know?
- Where would _____ be on the number line? How do you know?
- What number would be halfway along the number line? How do you know?

Possible sentence stems

- The start point is _____ and the end point is _____
- There are _____ intervals on the number line.
- Each interval is worth _____
- The number line is counting up in _____

National Curriculum links

- Count from zero in multiples of 4, 8, 50 and 100; find 10 or 100 more or less than a given number
- Identify, represent and estimate numbers using different representations

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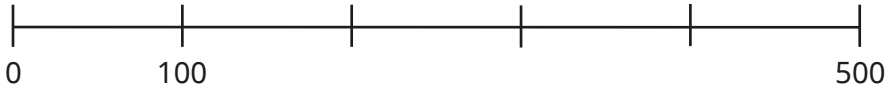
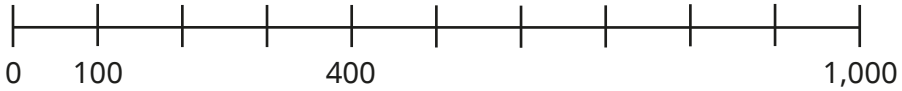
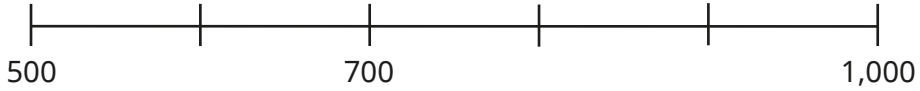
Number line to 1,000

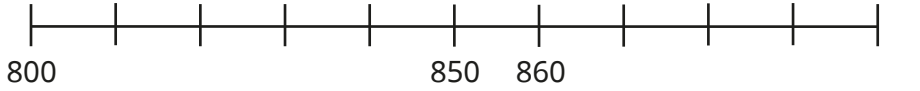
Key learning

- Complete the number lines.

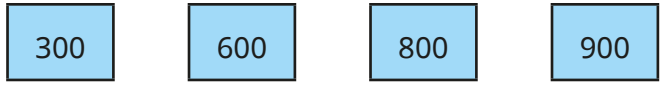


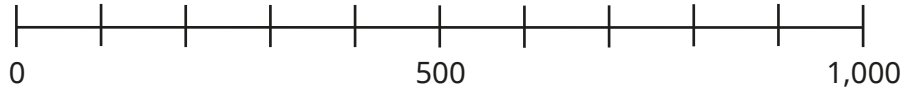




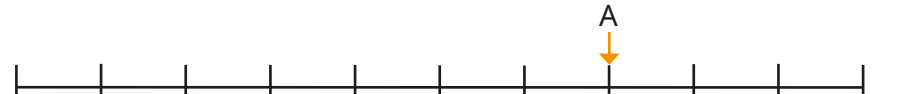


- Draw an arrow to show where each number belongs on the number line.





- What numbers are the arrows pointing to?



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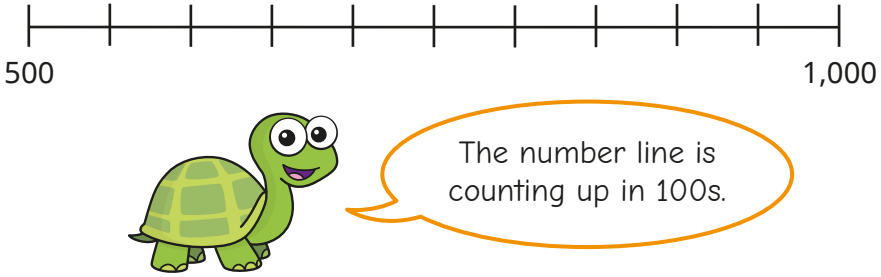
Number line to 1,000

Reasoning and problem solving

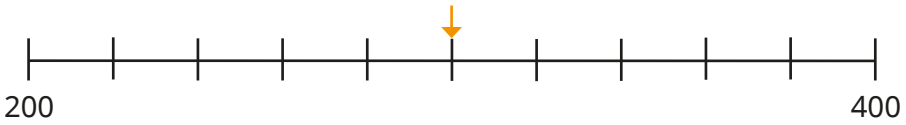


Do you agree with Tiny?

Explain your answer.

No

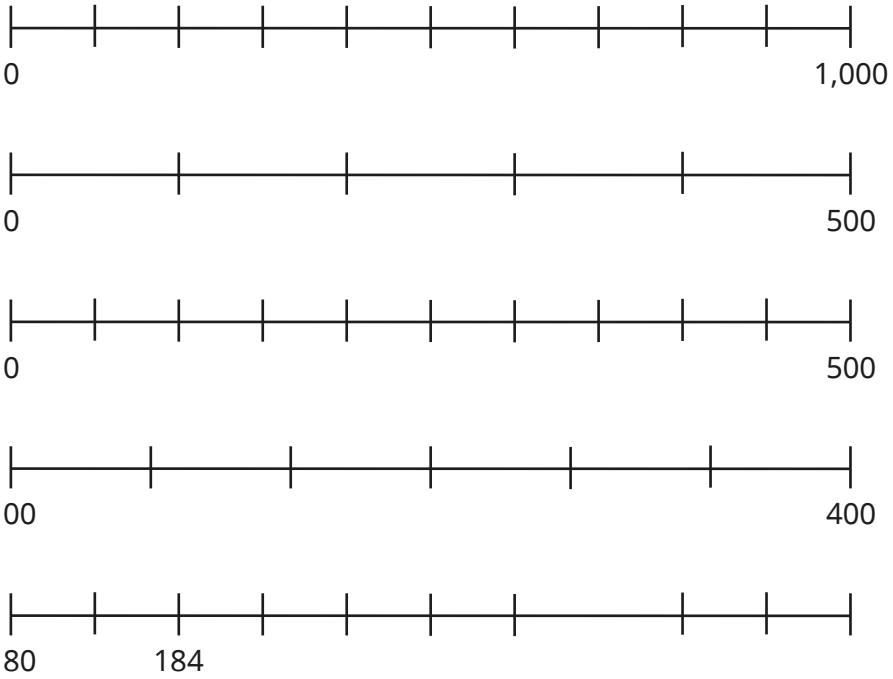
What number is the arrow pointing to?



How did you work this out?

300

Label 200 on each number line.



What do you notice?

arrows drawn in the correct positions

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Estimate on a number line to 1,000

Notes and guidance

Building on the previous small step, children estimate the position of numbers on number lines within and up to 1,000

Children use their existing number sense to complete their estimates and can explain their thinking. Initially, they consider key intervals that are factors of 1,000, including but not limited to multiples of 100. Thinking beyond this, they should try to be as accurate as possible, using their knowledge of the midpoint of intervals and which of the two divisions a number is closer to.

Children should understand that their answer might not be exactly the same as their partner's, as they are only able to estimate the positions or values.

Things to look out for

- Children may think that values cannot fall between divisions at all.
- Children may identify the value of the nearest division rather than considering the values that lie between divisions on the number line.
- Children may position any number that lies between two divisions exactly at the midpoint of the interval, rather than considering which division the number is closest to.

Key questions

- What is the number line counting up in? How do you know?
- Where would _____ be on the number line? How do you know?
- Is _____ closer to _____ or _____? How do you know?
- Why can you only estimate?
- What number is halfway between _____ and _____?
- How accurate do you think your estimate is? How could you be more accurate?

Possible sentence stems

- _____ is closer to _____ than _____, so the position of _____ on the number line is closer to _____ than _____
- _____ is more/less than halfway along the interval, so the position of _____ is closer to _____

National Curriculum links

- Count from zero in multiples of 4, 8, 50 and 100; find 10 or 100 more or less than a given number
- Identify, represent and estimate numbers using different representations

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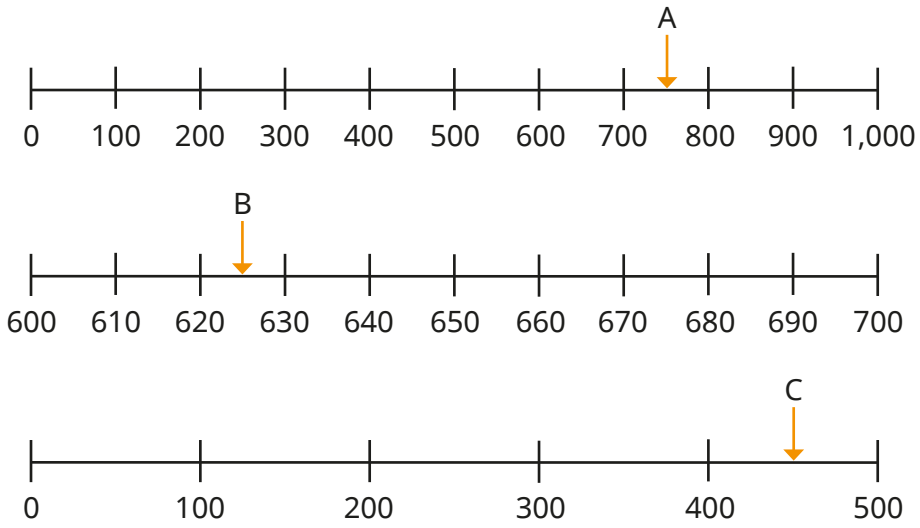
Estimate on a number line to 1,000

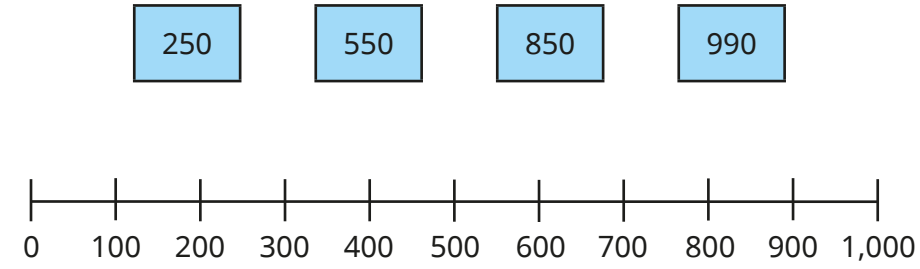
Key learning

- Estimate the numbers that the arrows are pointing to.

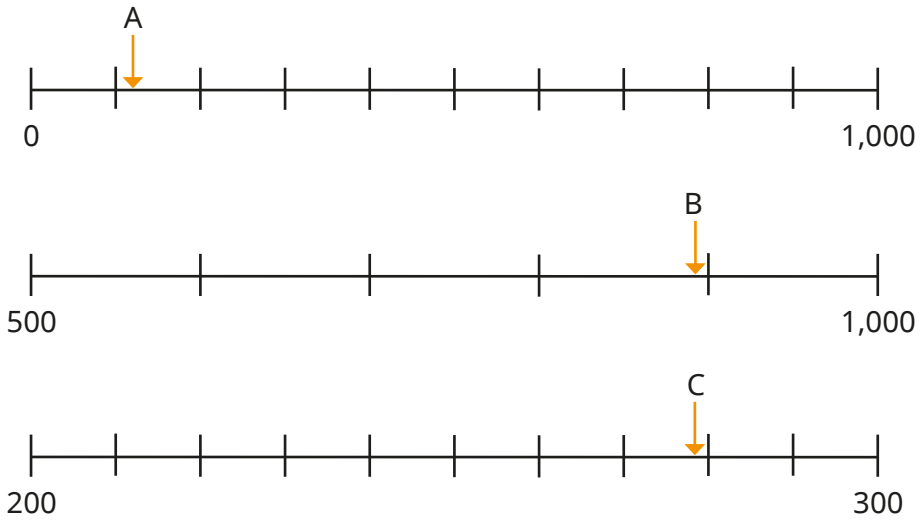


Why are your answers only estimates?

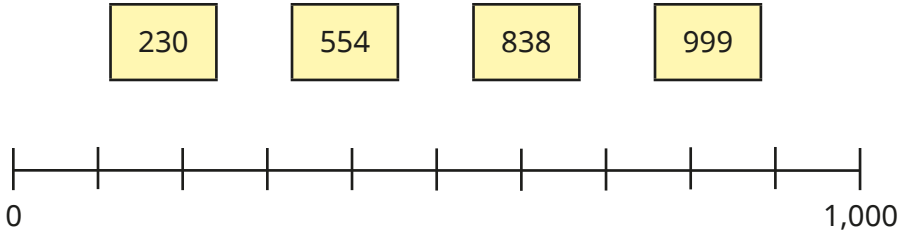
- Estimate where the numbers belong on the number line.



- Estimate the numbers that the arrows are pointing to.



- Estimate where the numbers belong on the number line.



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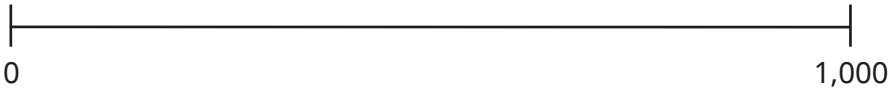
Estimate on a number line to 1,000

Reasoning and problem solving

Here is a number line from 0 to 1,000

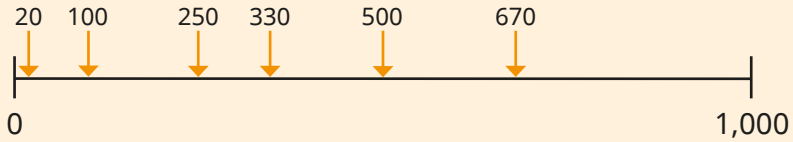


Estimate where the numbers belong on the number line.

100	250	330	500	20	670

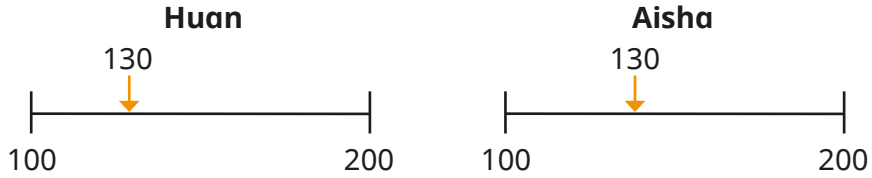
Compare answers with a partner.

Which number was the easiest to estimate?



500 is the easiest to estimate because it is the midpoint.

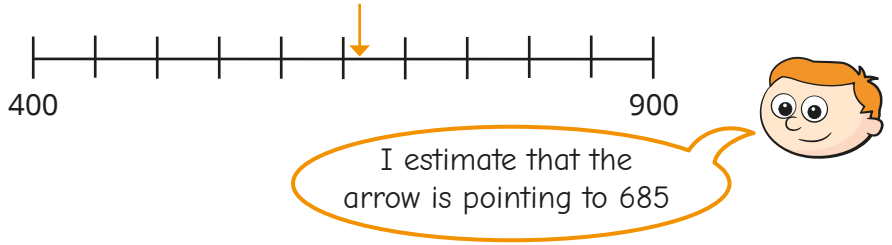
Huan and Aisha have estimated where 130 belongs on the same number line.



Can Huan and Aisha both be correct?

Talk about it with a partner.

Yes



Explain why Ron cannot be correct.

685 is past the midpoint of the interval.

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Compare numbers to 1,000

Notes and guidance

In this small step, children compare numbers using concrete resources, pictorial representations, words and symbols.

When given two numbers represented by objects, children use comparative language and symbols to determine which is greater/smaller. Encourage children to use prior learning to help them choose an efficient method to compare. For example, children may choose to place the numbers on a number line, make them using concrete resources or draw them in a place value chart.

By the end of this step, children can explain why they always start with the highest place value when comparing numbers.

Things to look out for

- When comparing numbers using concrete resources, children may think that the more pieces of equipment they have, the greater the number. For example, they may think that 1 hundred and 9 ones is greater than 2 hundreds because they have 10 individual objects compared to 2
- The greater than (>) and less than (<) symbols may need recapping with smaller numbers before comparing numbers up to 1,000

Key questions

- How do you know which number is greater?
- Do you start comparing hundreds, tens or ones first? Why?
- What strategy did you use to compare the two numbers? Is this the same as or different from your partner's?
- Are the base 10 and place value counters showing the same number? How do you know?

Possible sentence stems

- _____ is greater than _____ because ...
- _____ is less than _____ because ...
- When comparing numbers, I start with the _____ place value column.
  If they are the same, I will look at the _____ place value column.

National Curriculum links

- Compare and order numbers up to 1,000

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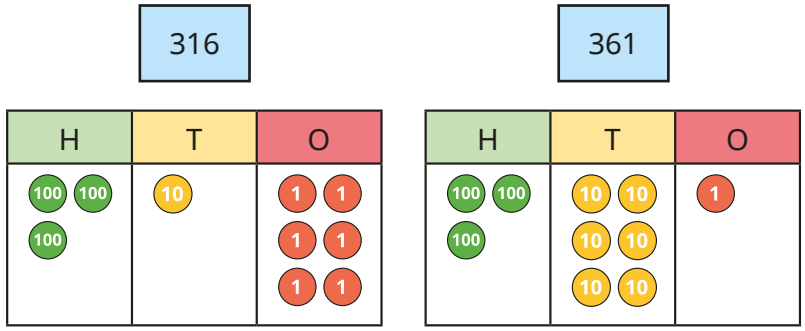
Compare numbers to 1,000

Key learning

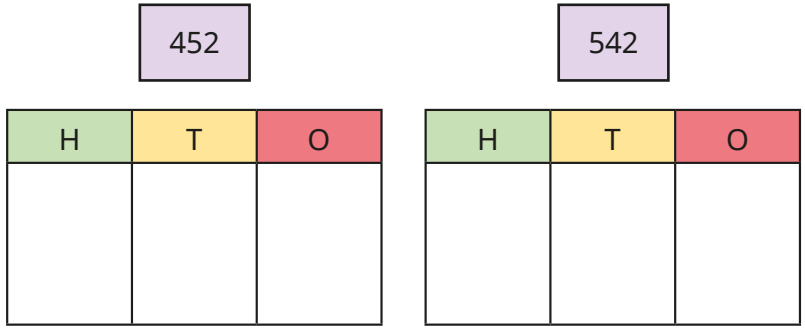
- Which number is greater?



_____ is greater than _____

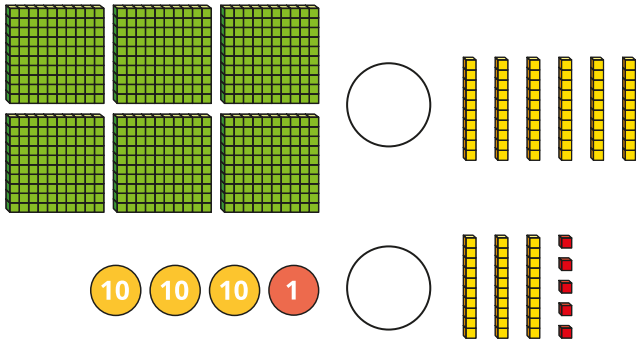
Explain how you know.

- Use place value counters to make and compare the numbers.



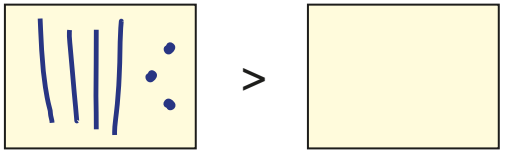
452 is _____ than 542

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



- Nijah has used lines and dots to show a number.

Draw lines and dots to make the statement correct.



- Which is the greater number in each pair?

nine hundred and two	920
500 and 68	563
7 hundreds and 6 ones	76 tens

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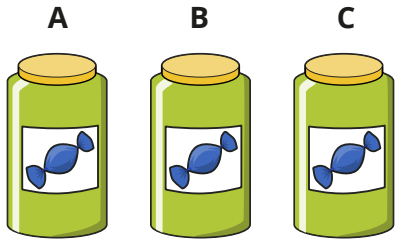
Compare numbers to 1,000

Reasoning and problem solving

Mo has three jars of sweets.



Jar A has 235 sweets.

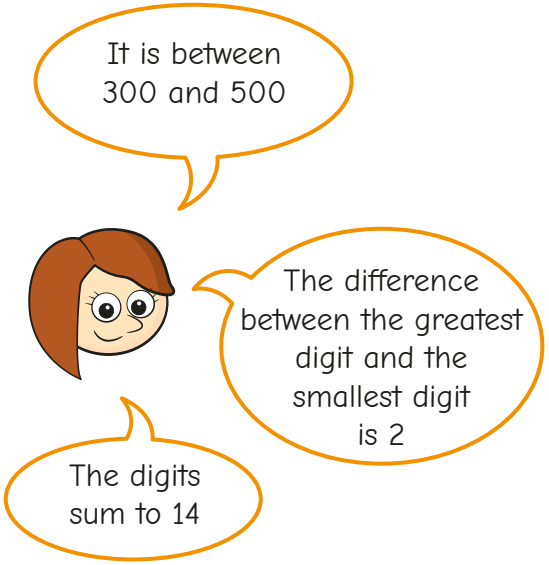
Jar C has 175 sweets.

How many sweets could be in jar B?

Explain how you know.

any number of sweets between 176 and 234

Rosie is thinking of a number.



What could Rosie's number be?

Is there more than one answer?

Explain each step of your thinking.

446 or 464

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Order numbers to 1,000

Notes and guidance

In this small step, children order a set of numbers up to 1,000

Children order numbers from smallest to greatest, and from greatest to smallest. For consistency, use the word "greatest" rather than "biggest" or "largest" when describing numbers. Children are also introduced to the language "ascending" and "descending".

A secure understanding of place value is vital for this step, as children need to understand that a digit in the hundreds column, for example, is worth more than a digit in the tens column. Children can continue to use concrete resources, such as base 10, to justify their decisions.

Things to look out for

- Children tend to order numbers from smallest to greatest, so ensure attention is drawn to those questions where they need to order from greatest to smallest.
- Children may just look at the digits and not consider their place values.
- When comparing numbers with different numbers of digits, children may focus only on the first digit of each number and not consider the place value of this digit.

Key questions

- Can you show each number using base 10?
- What is the same about each number? What is different?
- Which number is the greatest? Which number is the smallest? How do you know?
- When comparing two numbers, if the first digits are equal in value, what do you look at next?
- What is different about comparing numbers with the same number of digits and comparing numbers with different numbers of digits?

Possible sentence stems

- _____ hundreds is greater than _____ hundreds, so _____ is the greater number.
- The numbers are ordered from smallest to greatest.
  They are in _____ order.
- The numbers are ordered from greatest to smallest.
  They are in_____ order.

National Curriculum links

- Compare and order numbers up to 1,000

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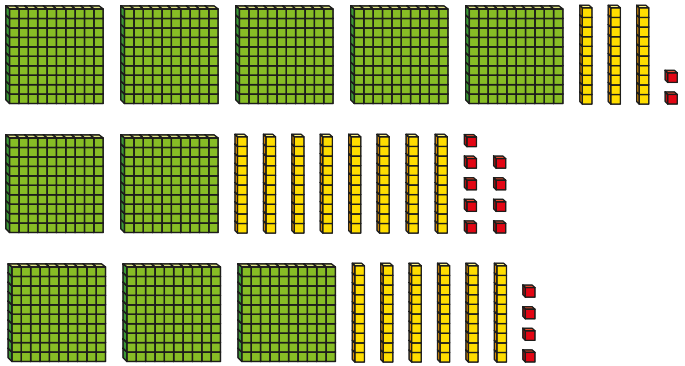
Order numbers to 1,000

Key learning

- What numbers are shown?



Write the numbers in order. Start with the smallest number.

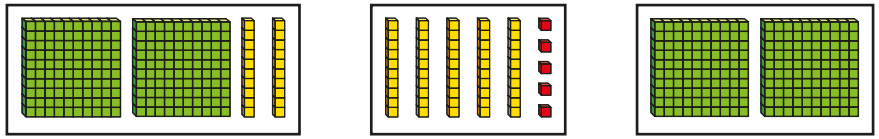
- Write the numbers in order. Start with the greatest number.

H	T	O
4	4	2

H	T	O
3	9	7

H	T	O
4	1	8

- Here are three numbers in base 10



Write the numbers in order. Start with the smallest number.

- Make each number using base 10

59	401	143

Write the numbers in order. Start with the smallest number.

Write the numbers in order again. Start with the greatest number.

- Use the word "ascending" or "descending" to complete the sentences.
  - When a plane is coming in to land, it is _____
  - Scott is walking up a mountain. He is _____ the mountain.
  - When a set of numbers is ordered from smallest to greatest, they are in _____ order.
  - When a set of numbers is ordered from greatest to smallest, they are in _____ order.

- Here are the heights of five children.

122 cm	120 cm	119 cm	124 cm	121 cm

Write the heights in ascending order.

Write the heights in descending order.

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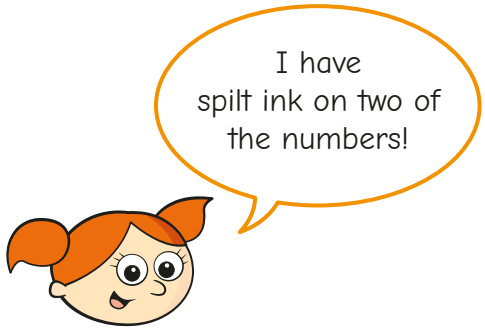
Order numbers to 1,000

Reasoning and problem solving

Alex has written six numbers in ascending order.



214, [redacted] 243, 256, [redacted] 289

What could the hidden numbers be?

Explain how you know.

first number: between 215 and 242

second number: between 257 and 288

Is the statement true or false?

> When ordering numbers, you only need to look at the place value column with the highest value.

Explain your answer.

False

The numbers are in descending order.

32__	3__2	2__3	__32	__23

The same digit is missing in each number.

What could the missing digit be?

0 or 1

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Count in 50s

Notes and guidance

In this small step, children count in 50s for the first time.

Children use their knowledge of the 5 times-table to support their understanding when counting in 50s and recognise that when counting in 50s, each number they say is 10 times the size of the corresponding number when counting in 5s.

Children start by counting up in 50s from zero, and by the end of the step they can count both forwards and backwards, starting at any multiple of 50 without going beyond 1,000

Number lines and number tracks are used to support counting, and this is also a good opportunity to revisit contexts such as money and measures.

Things to look out for

- Children may struggle when crossing the hundred boundaries. For example, they might say 50, 100, 200 or 50, 100, 105
- Children may struggle when counting beyond 950, for example they may say 900, 950, 100
- When counting backwards, children may start counting forwards again once they reach a multiple of 100, for example 250, 200, 250

Key questions

- What is the same about counting in 5s and counting in 50s?
- What is different about counting in 5s and counting in 50s?
- What is the connection between the 5 times-table and the 50 times-table?
- What patterns do you notice?
- When counting in 50s from zero, will you ever say a number with _____ tens? How do you know?

Possible sentence stems

- When counting in 50s, the number before/after_____ is _____
- 50 more/less than _____ is _____
- If 5 lots of _____ is _____, then 50 lots of_____ is _____

National Curriculum links

- Count from zero in multiples of 4, 8, 50 and 100; find 10 or 100 more or less than a given number

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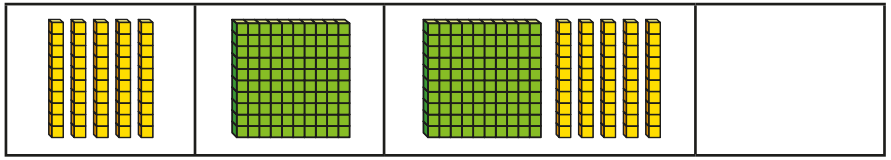
Count in 50s

Key learning

- What numbers are shown on the number track?



Draw base 10 to complete the number track.

- Esther has made a number track for counting in 5s.

5	10	15	20	25	30

Ben has made a number track for counting in 50s.

50	100	150	200	250	300

What is the same about their number tracks? What is different?

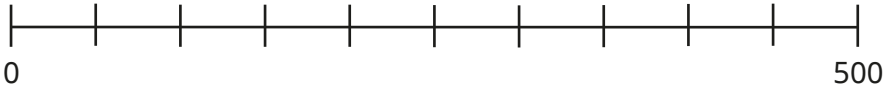
What patterns do you notice?

- Complete the number tracks.

50		150	200			350		450	

	750	700	650			500			350

- Complete the number line.



- Tom has written two number patterns.

50, 100, 105, 200, 250, 300 ...

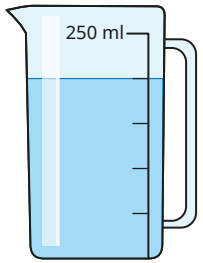
990, 950, 900, 850, 800 ...

Find and explain the mistake that Tom has made in each pattern.

- Here are some packs of cards.

How many cards are there altogether?

- How many millilitres of water are there in the jug?



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Count in 50s

Reasoning and problem solving

Jack has some 50p coins.

How many 50p coins does Jack have?

7 coins

Whitney has some 50p coins.

Explain why Whitney must be incorrect.

When counting in 50s from zero, we do not say 230, so Whitney cannot be correct.

Is each statement always true, sometimes true or never true?

When counting in 50s starting from zero, the numbers are all even.	always
There are only two digits in a multiple of 50	sometimes
Only the hundreds and tens columns change when counting in 50s.	sometimes

Talk about your answers with a partner.

If 8 × 5 = 40, what is 8 × 50?

Compare answers with a partner.

How did you work this out?

400

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Autumn Block 2

Addition and subtraction

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Small steps

Step 1	Apply number bonds within 10
Step 2	Add and subtract 1s
Step 3	Add and subtract 10s
Step 4	Add and subtract 100s
Step 5	Spot the pattern
Step 6	Add 1s across a 10
Step 7	Add 10s across a 100
Step 8	Subtract 1s across a10

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Small steps

Step 9	Subtract 10s across a 100
Step 10	Make connections
Step 11	Add two numbers (no exchange)
Step 12	Subtract two numbers (no exchange)
Step 13	Add two numbers (across a 10)
Step 14	Add two numbers (across a 100)
Step 15	Subtract two numbers (across a 10)
Step 16	Subtract two numbers (across a 100)

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Small steps

Step 17	Add 2-digit and 3-digit numbers
Step 18	Subtract a 2-digit number from a 3-digit number
Step 19	Complements to 100
Step 20	Estimate answers
Step 21	Inverse operations
Step 22	Make decisions

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Apply number bonds within 10

Notes and guidance

In Year 2, children learnt to add and subtract two 2-digit numbers, including with exchanges. Throughout this block children build on that knowledge, working towards adding and subtracting 2-digit and 3-digit numbers with exchanges. To be successful with this, it is essential that children are confident in both using and applying their number bonds to and within 10 and this small step provides opportunity to consolidate this.

By the end of this small step, children should be more confident at recalling all the number bonds up to 10 in a variety of contexts. They will then apply this knowledge to number bonds to 100, for example: 3 + 2 = 5, so 30 + 20 = 50

Children use a variety of representations, including base 10, place value counters, double-sided counters, number lines, part-whole models and bar models.

Things to look out for

- Instead of recalling number facts, children may continue to rely on using fingers or manipulatives to add two numbers together.
- When using related facts of bonds to 10 to find bonds to 100, children may not increase all three numbers by a factor of 10

Key questions

- Which is the whole and which are the parts?
- What needs to be added to this part to make the whole?
- If you take this part from the whole, what will be left?
- Where would this number go in the part-whole model?
- What other number facts do you know if you know this?
- If you multiply both parts by 10 then add them together, what happens to the whole?

Possible sentence stems

- If the whole is _____ and one part is _____, then the other part is _____
- _____ + _____ = 10, so _____ + _____ = 100
- If I know that _____ + _____ = _____, then I also know ...

National Curriculum links

- Add and subtract numbers mentally, including:
  - a 3-digit number and ones
  - a 3-digit number and tens
  - a 3-digit number and hundreds

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Apply number bonds within 10

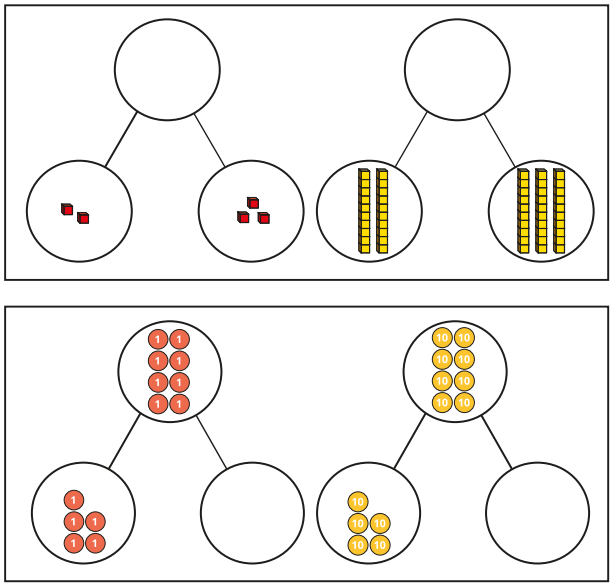
Key learning

- Annie has 9 double-sided counters.

She turns over one counter and sees the number fact 8 + 1 = 9

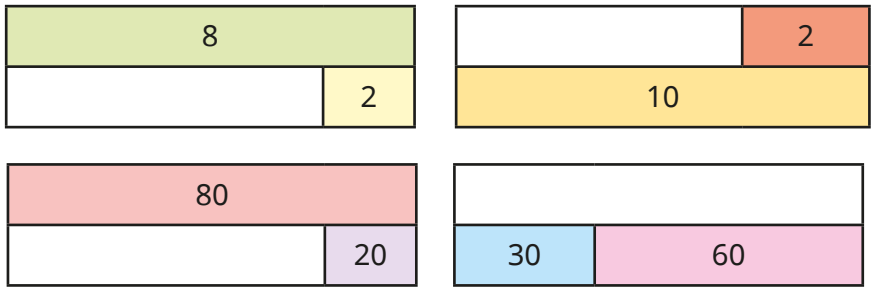
What other number facts are there for the number 9?

- Complete each pair of part-whole models.



Write a number sentence for each part-whole model.

- Complete the bar models.



Write the fact family for each bar model.

- Complete the addition facts.
  - 2 + _____ = 5
  - _____ + 4 = 7
  - _____ = 6 + 3
  - 4 + _____ = 9
  - 50 + 30 = _____
  - 70 = 20 + _____

Write two subtraction facts for each addition fact.

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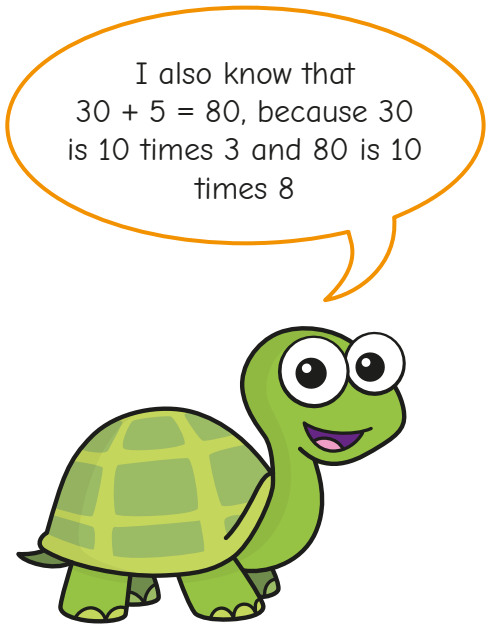
Apply number bonds within 10

Reasoning and problem solving

Tiny knows that 3 + 5 = 8

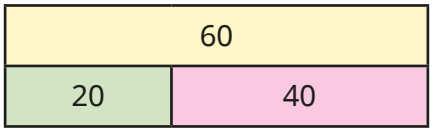


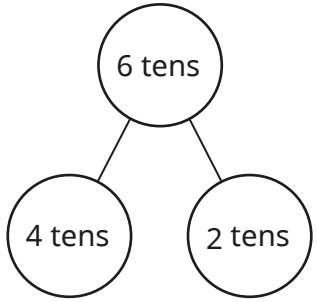
Is Tiny correct?

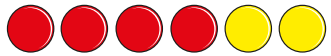
Explain your answer.

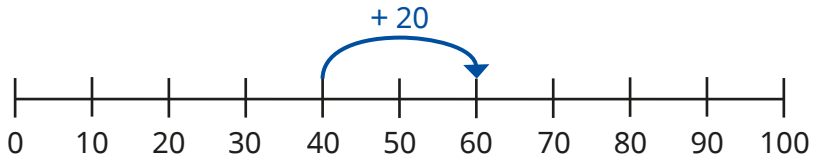
No

Which is the odd one out?









Explain your answer.

The odd one out is the counters.

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Add and subtract 1s

Notes and guidance

In Year 2, children mentally added and subtracted 1s to and from a 2-digit number. In this small step, this skill is developed and extended to include 3-digit numbers.

At this stage of the block, there are no exchanges and therefore the tens and hundreds columns do not change. Using a place value chart alongside their calculations, children see that when 1s are added to or subtracted from a 3-digit number, the ones column changes every time.

Although the examples in this small step involve a change to the ones column only, it is worth asking the question, "Do you have enough ones to make an exchange?" This provides opportunity to reinforce the fact that 1 ten is made up of 10 ones, and since none of the ones columns in this step have more than 9 ones, there are no exchanges, so the tens and hundreds columns do not change.

Things to look out for

- Children may add to or subtract from the incorrect column in a number, for example 123 + 1 = 223
- Children may incorrectly adjust a known number fact when one number is increased by 1, for example 57 – 5 = 52, so 57 – 6 = 53; children may assume that because 5 has increased by 1, the answer should too.

Key questions

- What happens to any number when you add a 1-digit number?
- What happens to any number when you subtract a 1-digit number?
- Which columns change in a number when you add or subtract a 1-digit number?
- Will more than one column ever change?

Possible sentence stems

- _____ ones plus/minus _____ ones is equal to _____ ones.
- When adding or subtracting 1s to or from a number, the digit in the _____ column always changes.
- If I know 3 + 6 = 9, then I know that 123 + 6 = _____

National Curriculum links

- Add and subtract numbers mentally, including:
  - a 3-digit number and ones
  - a 3-digit number and tens
  - a 3-digit number and hundreds

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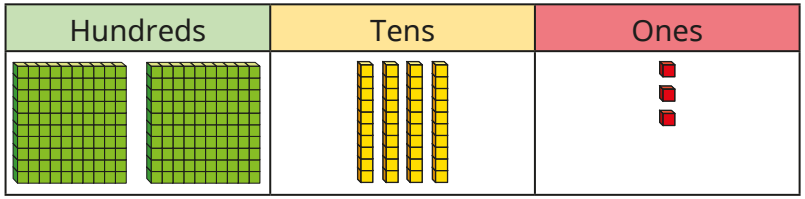
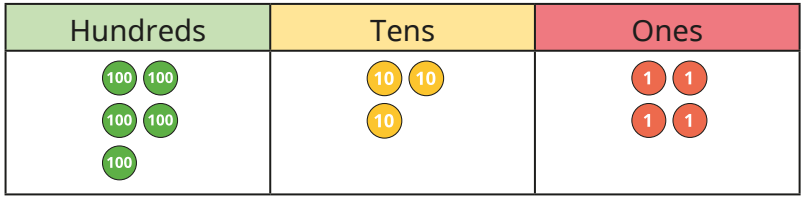
Add and subtract 1s

Key learning

- Use the place value charts to help you work out the calculations.
  - 243 + 5 = _____



  - 534 – 2 = _____



- Complete the table.

  One has been done for you.

– 3	Number	+ 3
290	293	296
	294	
	295	
	296	

- Continue the pattern.

258 = 251 + 7

257 = 251 + _____

256 = 251 + _____

255 = 251 + _____

254 = 251 + _____

253 = 251 + _____

252 = 251 + _____

251 = 251 + _____

Work with a partner.

Create your own pattern using a different number fact.

- Write <, > or = to compare each pair of number facts.

345 + 4 ◯ 349 – 5

825 + 3 ◯ 823 + 2

101 + 5 ◯ 109 – 2

467 – 1 ◯ 467 – 2

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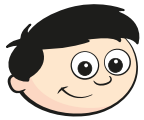
Add and subtract 1s

Reasoning and problem solving

Dexter and Whitney are adding 1s.



Dexter

When adding any 1-digit number to any 3-digit number, the answer will always be even.

Whitney

No, the answer will always be odd.

Who do you agree with?

Explain your answer.

Both are incorrect.

Huan and Dani each have 252 stickers.

Huan is given an extra 6 stickers.

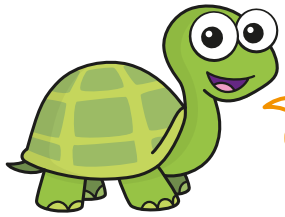
Dani is given an extra 7 stickers.

Who has more stickers?

Is there more than one way of working it out?

Dani

Tiny is working out an addition.



253 + 3 = 283

What mistake has Tiny made?

Tiny has added 3 tens instead of 3 ones.

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Add and subtract 10s

Notes and guidance

Building on the small step in Year 2, when children added or subtracted 10s to and from a 2-digit number, children now extend this learning to 3-digit numbers. In this step, this does not require any crossing of the next or previous hundred.

Children use a range of models and representations, including place value charts, to explore the effect of adding or subtracting multiples of 10. Children should see that in these examples only the tens column changes, with the hundreds and ones columns remaining the same.

It is also important to highlight to children how they can use number bonds both to and within 10 to support this step. For example, 2 + 3 = 5, so 20 + 30 = 50. Using the language of "2 ones/tens plus 3 ones/tens is equal to 5 ones/tens" can support this.

Things to look out for

- Children may identify the incorrect place value column, particularly if using plain counters in a place value chart, for example 230 + 20 = 430 or 232
- Children may not understand placeholders, for example 736 – 30 = 706, not 76

Key questions

- What is the value of the digit _____ in the number _____?
- How many tens are there in _____?
- How many tens are you adding/subtracting?
- Will the value in the tens column increase or decrease? By how much?
- Which place value columns have changed/stayed the same?
- If you know 7 ones minus 3 ones is equal to 4 ones, then what is 7 tens minus 3 tens?
- What is the inverse of adding/subtracting _____?

Possible sentence stems

- There are _____ hundreds, _____ tens and _____ ones.
- _____ tens plus/minus _____ tens is equal to _____ tens.
- The tens column will increase/decrease by _____

National Curriculum links

- Add and subtract numbers mentally, including:
  - a 3-digit number and ones
  - a 3-digit number and tens
  - a 3-digit number and hundreds

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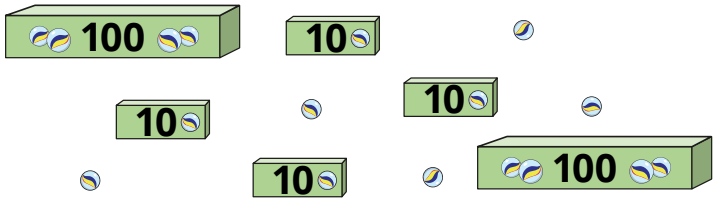
Add and subtract 10s

Key learning

- Aisha has some marbles.



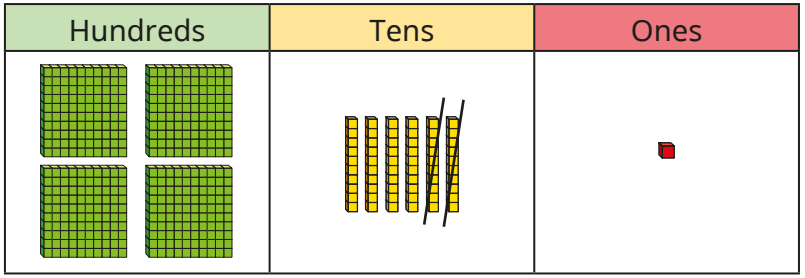
She buys 10 more marbles.

How many marbles does she have now?

How many marbles will Aisha have if she buys another:

- 20 marbles
- 30 marbles
- 40 marbles
- 50 marbles?

- Brett uses a place value chart and base 10 to work out 461 – 20

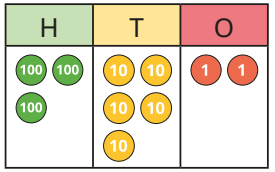


Use Brett's method to work out the subtractions.

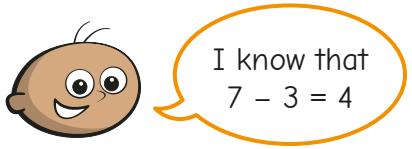
461 – 30	561 – 30	561 – 60

What do you notice?

- Complete the table.

– 10	Number	+ 10
		
		
		555

What would happen if the headings in the table changed to – 20 and + 20?

- 

How can Tommy use this fact to work out 879 – 30?

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Add and subtract 10s

Reasoning and problem solving

Tiny is working out a subtraction.

H	T	O
100 100 100 100 100	10 10 10 10	1 1 1 ~~1~~ ~~1~~ ~~1~~

What mistake has Tiny made?

What is the correct answer?

Tiny has subtracted 3 ones rather than 3 tens.

516

Ron makes a 3-digit number using the digit cards.

5	7	9

Ron subtracts 50 from his 3-digit number.

What number could Ron have now?

529 547

709 745

907 925

Fill in the missing digits.

452 – __0 = 422

2__3 + 40 = 273

5__5 – 90 = 505

452 – 30 = 422

233 + 40 = 273

595 – 90 = 505

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Add and subtract 100s

Notes and guidance

Building on the previous small steps, children now explore adding and subtracting multiples of 100. This will not require any crossing of the thousands.

Again, children use a range of models and representations, including place value charts, to explore the effect of adding or subtracting multiples of 100. Children recognise from the examples in this small step that only the hundreds place value column changes and the tens and ones columns remain the same.

It is also important to highlight to children how they can use number bonds to and within 10 to support in this step. For example, 8 – 5 = 3, so 800 – 500 = 300. Using the language of "8 ones/hundreds subtract 5 ones/hundreds is equal to 3 ones/hundreds" can support this.

Things to look out for

- Children may identify the incorrect place value column, particularly if using plain counters in a place value chart, for example 469 – 300 = 439 or 466
- If they are left with zero hundreds, for example 736 – 700, children may write 036. It is important to address why they do not require the leading zero.

Key questions

- What is the value of the digit _____ in the number _____?
- How many hundreds are there in _____?
- How many hundreds are you adding/subtracting?
- Will the value in the hundreds column increase or decrease? By how much?
- Which place value columns have changed/stayed the same?
- If you know 3 + 4 = 7, what is 300 + 400?
- What is the inverse of adding/subtracting _____?

Possible sentence stems

- There are _____ hundreds, _____ tens and _____ ones.
- _____ hundreds plus/minus _____ hundreds is equal to _____ hundreds.
- The hundreds column will increase/decrease by _____

National Curriculum links

- Add and subtract numbers mentally, including:
  - a 3-digit number and ones
  - a 3-digit number and tens
  - a 3-digit number and hundreds

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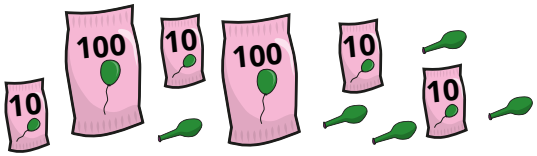
Add and subtract 100s

Key learning

- Kim has some balloons.



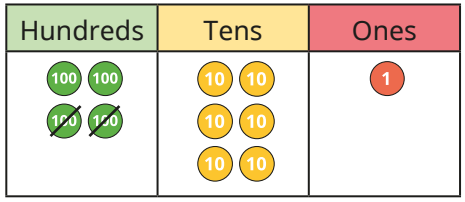
She buys 100 more balloons.

How many balloons does she have now?

How many balloons will Kim have if she buys another:

- 200 balloons
- 300 balloons
- 400 balloons
- 500 balloons?

- Filip uses place value counters and a chart to work out 461 – 200

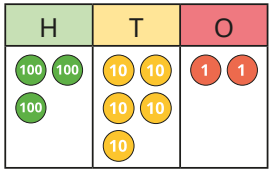


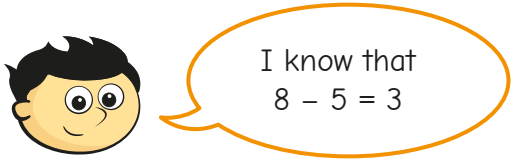
Use Filip's method to work out the subtractions.

461 – 300	561 – 300	561 – 500

What do you notice?

- Complete the table.

– 300	Number	+ 300
		
		
		606

- 

How can Jack use this fact to calculate 894 – 500?

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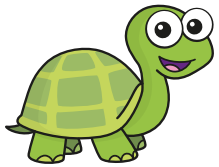
Add and subtract 100s

Reasoning and problem solving

When I subtract a multiple of 100 from a 3-digit number, the answer will always be a 3-digit number.



Do you agree with Tiny?

Explain your answer.

No

Write <, > or = to complete the statements.

976 – 300 ◯ 976 – 500

231 – 200 ◯ 231 + 100

642 – 300 ◯ 42 + 300

>

<

=

Start

378	+ 100	+ 200	– 200	+ 300
– 100	+ 300	– 500	+ 100	– 100
+ 500	– 300	+ 200	+ 200	– 100
– 200	+ 100	+ 100	– 100	+ 200
– 100	+ 300	– 500	+ 200	**778**

Finish

Find a path from the start to the finish so that your end number is 778

Is there more than one path?

What if the finish number is 578?

for example:

Start

378	+ 100	+ 200	– 200	+ 300
– 100	+ 300	– 500	+ 100	– 100
+ 500	– 300	+ 200	+ 200	– 100
– 200	+ 100	+ 100	– 100	+ 200
– 100	+ 300	– 500	+ 200	**778**

Finish

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Spot the pattern

Notes and guidance

In this small step, children consolidate their learning from the previous three steps, exploring the effect of adding or subtracting 1s, 10s or 100s to or from any 3-digit number. As with the examples in previous steps, there are no exchanges.

Children explore what changes and what stays the same when adding multiples of 1, 10 or 100, for example: "If we add/subtract 10s, only the tens place value column changes." It is important to highlight why this is the case, by noting that the additions in this step always use bonds of less than 10, 100 or 1,000; in the subtractions, the digits in the number subtracted are always smaller than digits in the original number.

Children also explore performing multiple calculations to a starting number using a combination of the skills covered in the previous steps. Function machines are a useful representation.

Things to look out for

- Children may identify the incorrect place value column, particularly if using plain counters in a place value chart, for example 469 – 300 = 439 or 466
- Children need to be confident with placeholders left in columns after a subtraction, for example knowing that 736 – 30 = 706, not 76

Key questions

- What is the value of the digit _____ in the number _____?
- Will the value in the ones/tens/hundreds column increase or decrease? By how much?
- Which place value columns have changed/stayed the same? Why?
- If you know 3 + 4 = 7, what else do you know?
- What is the inverse of adding/subtracting _____?
- Will you get the same result if the operations are performed in a different order?

Possible sentence stems

- There are _____ hundreds, _____ tens and _____ ones.
- _____ ones/tens/hundreds plus/minus _____ ones/tens/hundreds is equal to _____ ones/tens/hundreds.
- The ones/tens/hundreds column will increase/decrease by _____

National Curriculum links

- Add and subtract numbers mentally, including:
  - a 3-digit number and ones
  - a 3-digit number and hundreds
  - a 3-digit number and tens

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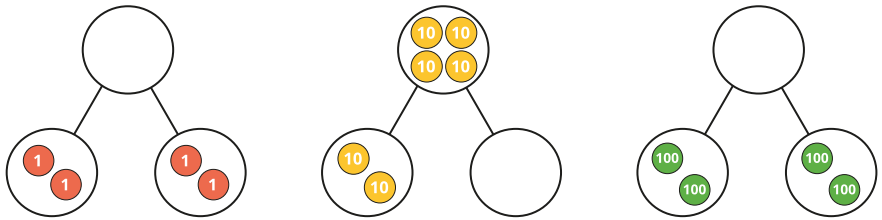
Spot the pattern

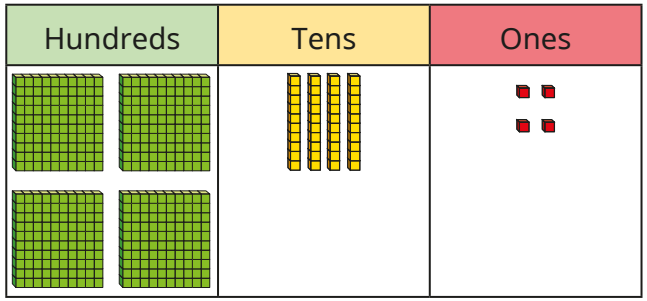
Key learning

- Complete the part whole models.



What do you notice?

-



Use the place value chart to help you complete the number sentences.

- 444 + 3 = _____
- 444 – 3 = _____
- 444 + 30 = _____
- 444 – 30 = _____
- 444 + 300 = _____
- 444 – 300 = _____

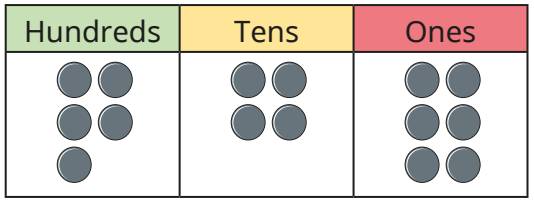
What do you notice? What stays the same and what changes?

-

Use Tiny's fact to complete the number sentences.

- 20 + 50 = _____
- 500 + 200 = _____
- 7 – _____ = 2
- 70 – _____ = 50
- 70 = _____ + 50
- _____ = 700 – 200

-

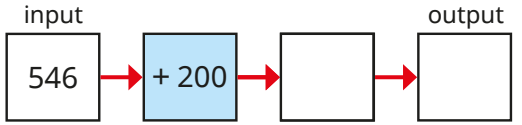


Nijah adds 2 counters to the hundreds column.

She then takes 4 counters from the tens column.

What number does Nijah now have?

Complete the function machine to show Nijah's calculations.



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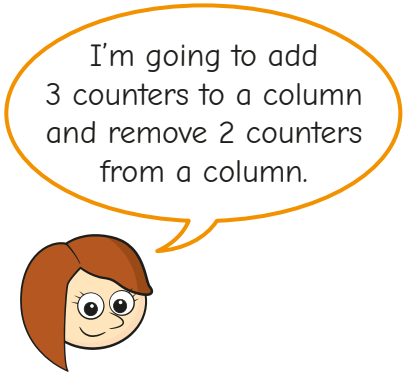
Spot the pattern

Reasoning and problem solving

Rosie makes this number in a place value chart.

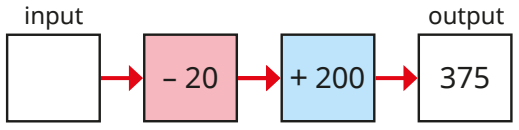
Hundreds	Tens	Ones
100 100	10 10 10 10 10 10	1 1 1 1

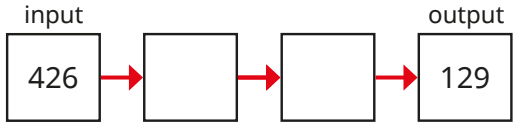


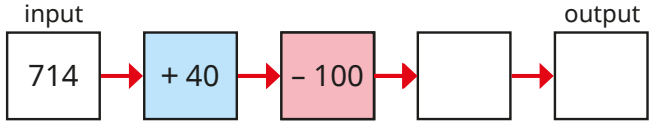
What number could Rosie have now?

544	562	364
292	274	94
265	247	67

Complete the function machines.







Is there more than one way each set of machines can be completed?

195

+ 3, – 300 or – 300, + 3

for example: + 1, 655; + 20, 674

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Add 1s across a 10

Notes and guidance

In Year 2 addition and subtraction, children explored strategies to add 1-digit numbers to a 2-digit number crossing 10. Children build on this to add a 1-digit number to a 3-digit number.

Children may initially rely on counting on in 1s, but the aim of this step is to build towards mental strategies for crossing the 10

It is vital that children are fluent in bonds to 10, so that they are able to identify the jump to the next multiple of 10. They also need to be fluent in their bonds within 10 to allow them to flexibly and efficiently partition numbers to work out how much further they need to jump from a multiple of 10

Number lines are a useful representation to model the process of jumping to and from the next multiple of 10

Things to look out for

- Children need to be able to identify the next multiple of 10
- Children may not be able to fluently partition a 1-digit number to work out how much further they need to jump from the multiple of 10
- Children may rely on counting on in 1s or using fingers, rather than using more efficient strategies to jump to and from the next multiple of 10

Key questions

- What is the next multiple of 10 after _____?
- How can you partition _____?
- What number do you add to _____ to make 10?
- What is the jump from _____ to the next multiple of 10?
- If _____ is a part/jump, what is the other part/jump _____?
- Which columns have changed/stayed the same?
- Which method do you prefer?

Possible sentence stems

- The next multiple of 10 after _____ is _____
- _____ can be partitioned into _____ and _____
- I need to add _____ to get to the next 10, and then add another _____

National Curriculum links

- Add and subtract numbers mentally, including:
  - a 3-digit number and ones
  - a 3-digit number and tens
  - a 3-digit number and hundreds

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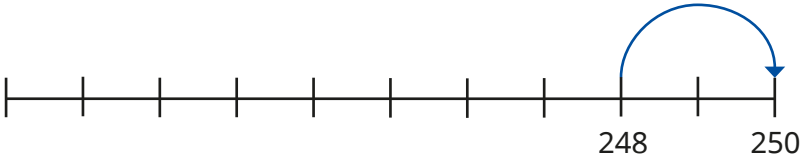
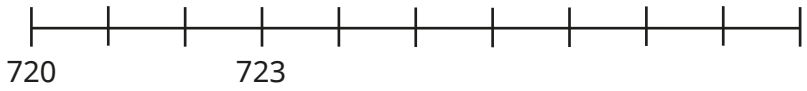
Add 1s across a 10

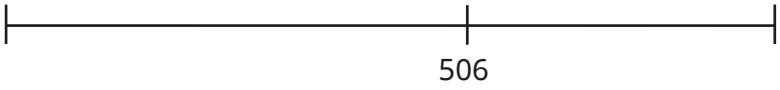
Key learning

- Work out the additions.
  - 237 + 1
  - 237 + 2
  - 237 + 3
  - 237 + 4
  - 237 + 5

- Use the number lines to find the jump to the next multiple of 10





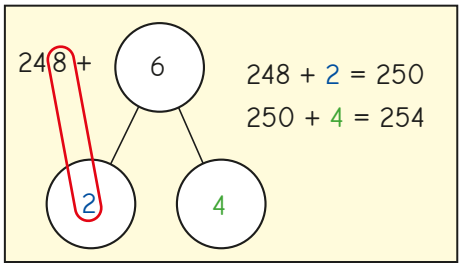


- Work out the additions.

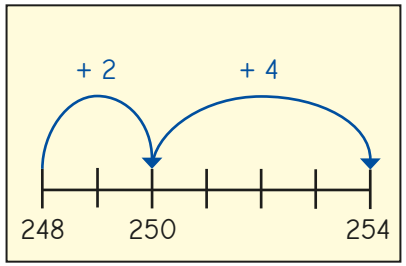
250 + 3	730 + 1	510 + 5
248 + 5	723 + 8	506 + 9

- Tom and Mo are working out 248 + 6

Tom



Mo



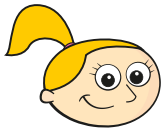
Talk about each method with a partner.

Whose method do you prefer?

Use that method to work out the additions.

248 + 9	638 + 3	579 + 6	589 + 4

- Eva is working out 856 + 7



I know that
6 + 7 = 13, so my tens will increase by 1 and I will have 3 ones.
856 + 7 = 863

Use Eva's method to work out the additions.

865 + 5	438 + 4	713 + 9	564 + 8

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Add 1s across a 10

Reasoning and problem solving

Here are four digit cards.

2	5	7	9

Use three of the digits to complete the addition in as many different ways as you can.

3			+	

Find all the possible totals.

In which additions did you need to cross a 10?

totals without crossing:

359, 377, 397, 399

totals with crossing:

332, 334, 336, 361, 366, 381, 384, 402

Is the statement always, sometimes or never true?

> When 7 and 5 are added together in the ones column, the digit in the ones column of the answer will always be 2

Explain your answer.

always true, because 5 + 7 = 12

Which additions are harder to work out?

234 + 3	506 + 8
455 + 7	521 + 6

Talk about your answer with a partner.

multiple possible answers, e.g.

455 + 7 and 506 + 8, because they cross a 10

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Add 10s across a 100

Notes and guidance

Children build on previous steps to add multiples of 10 to any 3-digit number where they are required to cross the next hundred. This small step focuses on mental strategies.

It is vital that children are fluent in their bonds to 100 so that they are able to identify the jump to the next multiple of 100. They also need to be fluent in their bonds within 100, for example 70 = 30 + 40, to allow them to efficiently and flexibly partition numbers to work out how much further they need to jump after reaching the next 100

It is important to explore with children which place value columns always/sometimes/never change when adding a multiple of 10

Things to look out for

- Children may find it difficult to add 10s over a hundred boundary.
- Children may need help to identify the next multiple of 100 and how far away it is.
- Children may not be able to fluently partition a multiple of 10 to work out how much further they need to jump from the next 100
- Children may omit the ones digit in the answer, for example writing 278 + 60 = 330

Key questions

- What is the next multiple of 100 after _____?
- How can you partition _____?
- What number do you add to _____ to make 100?
- If _____ is a part/jump, what is the other part/jump?
- Which columns have changed/stayed the same?
- Does the _____ column always/sometimes/never change?
- Which method is more efficient? Which method do you prefer?

Possible sentence stems

- _____ can be partitioned into _____ and _____
- The next multiple of 100 after _____ is _____
- I need to add _____ to cross the next 100, and then add another _____

National Curriculum links

- Add and subtract numbers mentally, including:
  - a 3-digit number and ones
  - a 3-digit number and tens
  - a 3-digit number and hundreds

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Add 10s across a 100

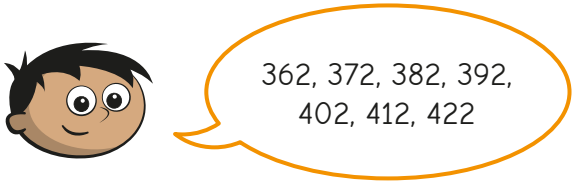
Key learning

- Complete the number tracks.

260	270		290			320	

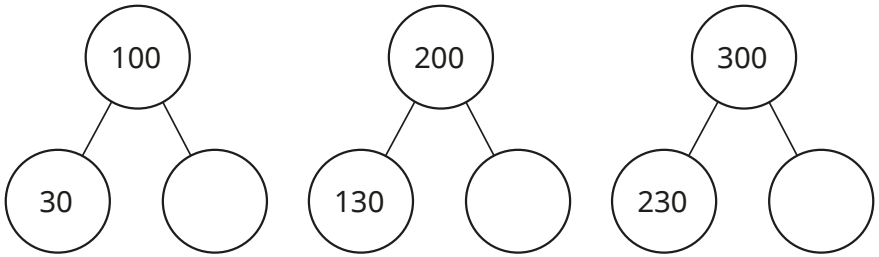
268		288	298				338

- Amir is working out 352 + 70 by counting on in 10s.



Use Amir's method to find 564 + 80

- Complete the part-whole models.

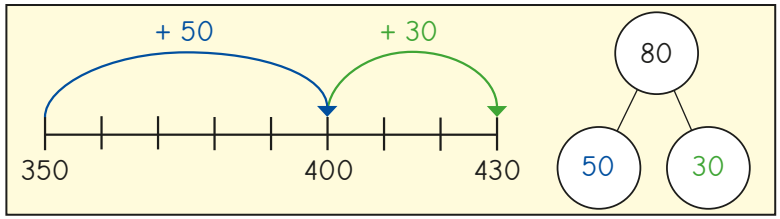


What do you notice?

- Find the missing numbers.

350 + _____ = 400	280 + _____ = 300	830 + _____ = 900
352 + _____ = 402	283 + _____ = 303	839 + _____ = 909

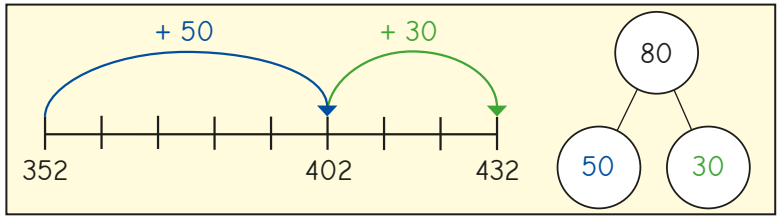
- Dora is working out 350 + 80



Use Dora's method to work out the additions.

240 + 80	690 + 80	690 + 40	90 + 830

- Scott uses a similar method to work out 352 + 80



Use Scott's method to work out the additions.

248 + 80	695 + 80	297 + 30	90 + 237

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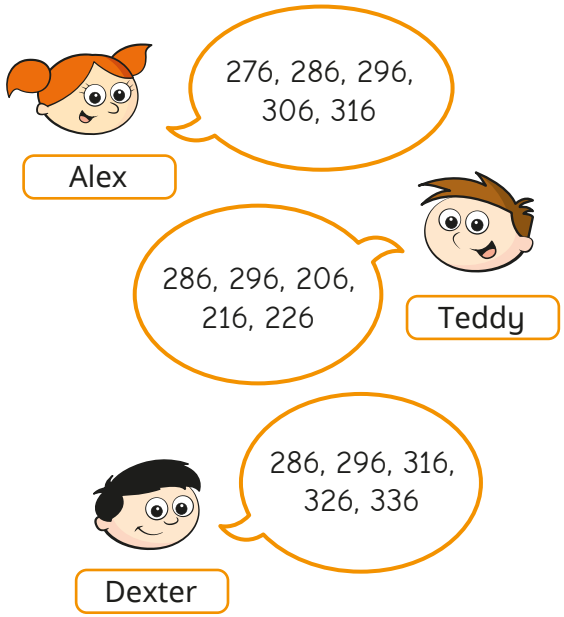
Add 10s across a 100

Reasoning and problem solving

Alex, Teddy and Dexter are working out 276 + 50 by counting on in 10s.

They have each made a different mistake.



What mistakes have they made?

What is the correct answer?

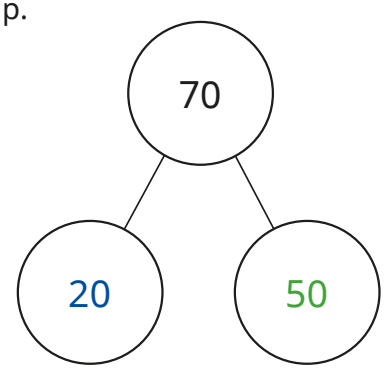
Alex has included 276, the start number.

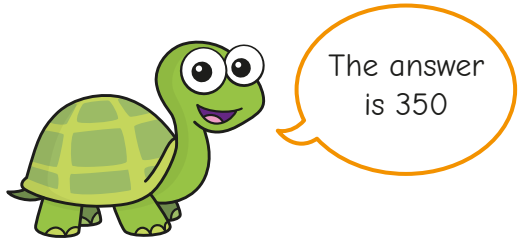
Teddy has not counted into the next hundred correctly.

Dexter has missed 306

326

Tiny is working out 284 + 70 using the part-whole model to help.





What mistake has Tiny made?

Work out the correct answer.

Tiny has partitioned 70 correctly and added the tens correctly, but has forgotten to include the ones.

354

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Subtract 1s across a 10

Notes and guidance

In Year 2, children covered strategies to subtract a 1-digit number from a 2-digit number crossing a 10. Children build on this, working towards subtracting a 1-digit number from a 3-digit number. They focus on mental strategies for crossing a 10

Children may start by counting back in 1s, but it is important to try to move towards the more efficient strategy of jumping to and from the previous multiple of 10

Children need to be fluent in their recall of number bonds to 10 and in applying them, so that they can subtract from a multiple of 10, for example 10 – 3 = 7, so 480 – 3 = 477. They also need to be fluent in their bonds within 10 to allow them to efficiently and flexibly partition numbers to work out how much further they need to jump back from a multiple of 10

Things to look out for

- Children may not be able to fluently partition a 1-digit number to work out how much further they need to jump back from the multiple of 10
- Children may rely on counting back in 1s or using fingers, rather than using more efficient strategies to jump to the previous multiple of 10

Key questions

- What is the previous multiple of 10 before _____?
- How can you partition _____?
- What is the jump from _____ to the previous multiple of 10?
- If _____ is a part/jump, what is the other part/jump _____?
- Which columns have changed/stayed the same?
- Which method do you prefer?

Possible sentence stems

- The previous multiple of 10 before _____ is _____
- _____ can be partitioned into _____ and _____
- I need to subtract _____ to get to the previous multiple of 10, then subtract _____ more.

National Curriculum links

- Add and subtract numbers mentally, including:
  - a 3-digit number and ones
  - a 3-digit number and tens
  - a 3-digit number and hundreds

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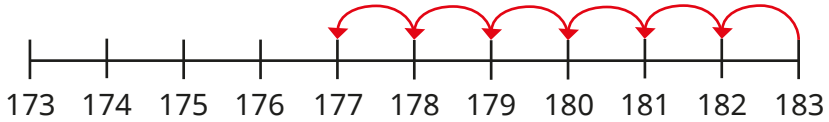
Subtract 1s across a 10

Key learning

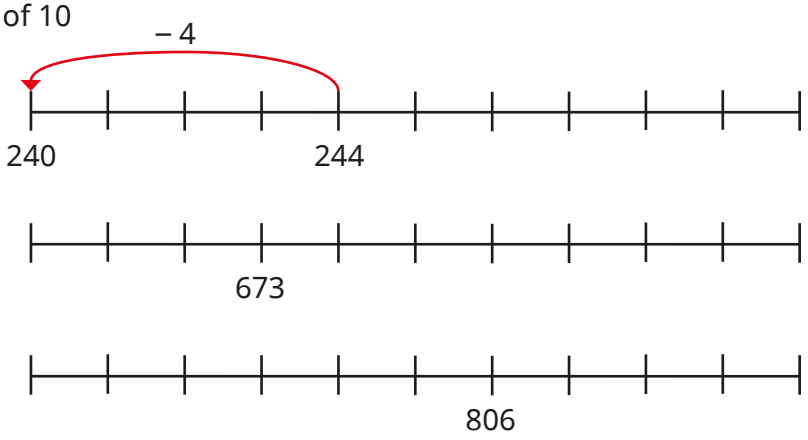
- Use the number line to work out 183 – 6



Use a number line to work out the subtractions.

683 – 6	623 – 6	481 – 7	682 – 5

- Use the number lines to find the jump to the previous multiple of 10

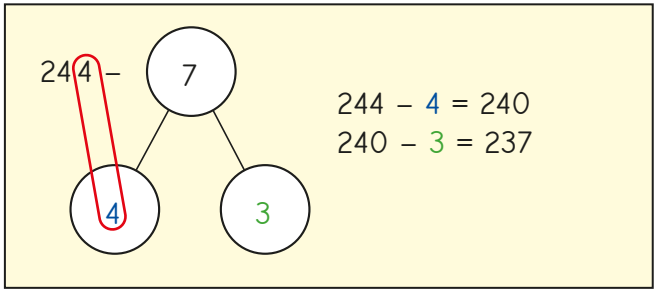


- Work out the subtractions.

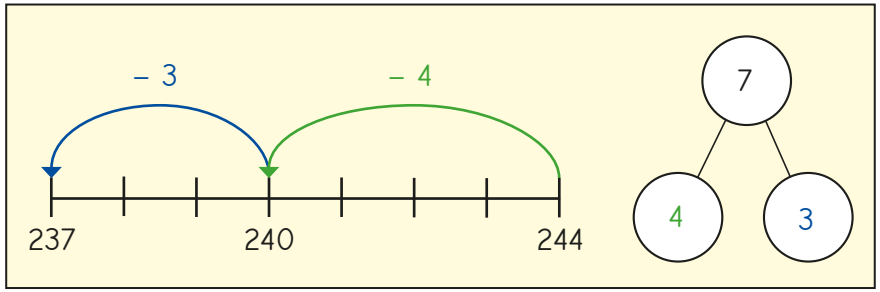
70 – 3	370 – 3	640 – 8	520 – 7

- Scott and Whitney are working out 244 – 7

Scott's method



Whitney's method



Whose method do you prefer?

Use that method to work out the subtractions.

242 – 9	633 – 7	171 – 6	581 – 4

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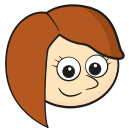
Subtract 1s across a 10

Reasoning and problem solving

Rosie, Annie and Ron are working out 234 – 9



Rosie: I started at 234 in my head and counted back in 1s.

Annie: I subtracted 10 and then added 1 back on.

Ron: I jumped back 4 to the previous 10 and then jumped back 5 more.

Use each method to work out the answer.

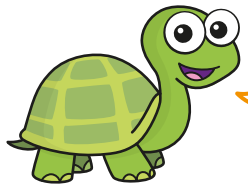
Whose method do you prefer?

225

164

1	2	3	4	5
6	7	8	9	

Tiny is subtracting each of the 1-digit numbers from 164



I will need to cross a 10 five times.

Do you agree with Tiny?

Explain your answer.

Yes

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Subtract 10s across a 100

Notes and guidance

Children extend their knowledge of subtracting 10s from any 3-digit number to include crossing a 100, using similar mental strategies to those covered in the previous small step.

Children may start by initially counting back in 10s, but it is important to try to move towards a more efficient strategy of jumping to and from the previous multiple of 100

Children need to be fluent in their bonds for multiples of 10 within 100 to allow them to efficiently and flexibly partition numbers to work out how much further they need to jump back from the multiple of 100, for example 50 = 30 + 20 and 40 + 10. Children also need to be fluent in their recall of number bonds to 100 and applying them so that they can subtract from a multiple of 100, for example 100 – 40 = 60, so 500 – 40 = 460 and 501 – 40 = 461

Things to look out for

- Children may not be able to fluently and flexibly partition a multiple of 10
- Children may rely on counting back in 10s, rather than using more efficient strategies.
- Children may forget to include the digit in the ones column in the answer, for example 732 – 50 = 680

Key questions

- What is the multiple of 100 before _____?
- How can you partition _____?
- What is the jump from _____ to the previous multiple of 100?
- If _____ is a part/jump, what is the other part/jump?
- Which columns have changed/stayed the same?
- Which method do you prefer? Which is more efficient?

Possible sentence stems

- The multiple of 100 before _____ is _____
- _____ can be partitioned into _____ and _____
- I need to subtract _____ to get to the previous multiple of 100, then subtract _____ more.

National Curriculum links

- Add and subtract numbers mentally, including:
  - a 3-digit number and ones
  - a 3-digit number and tens
  - a 3-digit number and hundreds

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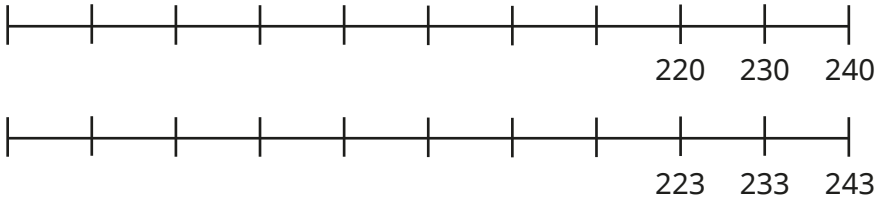
Subtract 10s across a 100

Key learning

- Complete the number lines by counting back in 10s.

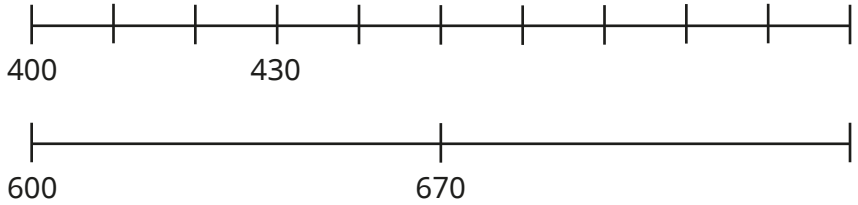


Use the number lines to work out the subtractions.

240 – 60	240 – 70	243 – 70	233 – 70

What do you notice?

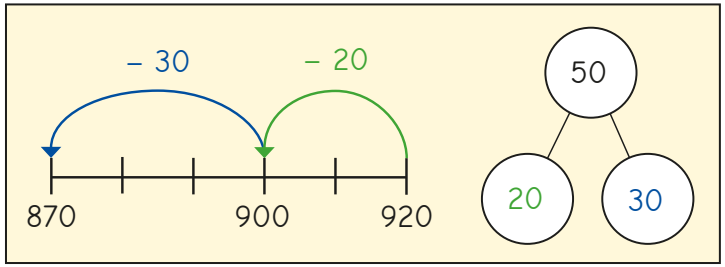
- Use the number lines to find the jump to the previous hundred.



- Work out the subtractions.

800 – 30	500 – 40	509 – 40	202 – 70

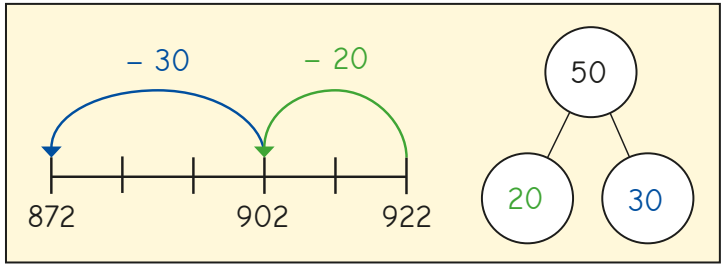
- Dani is working out 920 – 50



Use Dani's method to work out the subtractions.

320 – 50	320 – 70	340 – 70	580 – 90

- Huan is working out 922 – 50



Use Huan's method to work out the subtractions.

322 – 50	564 – 80	149 – 70	819 – 30

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Subtract 10s across a 100

Reasoning and problem solving

What mistake has Tiny made?

Tiny has subtracted 5 ones rather than 5 tens.

Complete the sentences with "always", "sometimes" or "never".

When I subtract a multiple of 10 from a 3-digit number, the ones column _____ changes.

When I subtract a multiple of 10 from a 3-digit number, the tens column _____ changes.

When I subtract a multiple of 10 from a 3-digit number, the hundreds column _____ changes.

never

always

sometimes

Here are some digit cards.

2	5	6	8

Use the digit cards to complete the subtraction in as many different ways as you can.

			–		0

How many times did you need to cross a 100?

Talk about it with a partner.

12 solutions include crossing a 100

12 solutions do not include crossing a 100

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Make connections

Notes and guidance

In this small step, children consolidate what they have learnt so far in this block by adding and subtracting 1s, 10s and 100s to/from 3-digit numbers, both with and without the need to cross a 10 or a 100

The focus is to develop number sense through explicitly exploring the connections between calculations. For example, if children know 5 + 7 = 12, then they also know that 12 – 5 = 7, 120 – 50 = 70 and 50 + 70 = 120

To support children in seeing these links, it is useful to use language such as "5 ones plus 7 ones is equal to 12 ones, so 5 tens plus 7 tens is equal to 12 tens." It is also vital that children have a strong understanding of the fact that 10 tens are equivalent to 1 hundred.

Things to look out for

- Children may not be confident with place value knowledge of 10 ones = 1 ten, 20 ones = 2 tens, 10 tens = 1 hundred and so on.
- Children may not be able to fluently and flexibly partition a multiple of 10 or 100
- Children may rely on counting on or back, or using written methods, rather than using more efficient strategies to jump to the next/previous multiple.

Key questions

- What is the multiple of 10/100 after _____?
- What is the multiple of 10/100 before _____?
- What is the jump from _____ to the next/previous multiple?
- If _____ is a part/jump, what is the other part/jump?
- Which columns have changed/stayed the same?
- Which method do you prefer? Which is more efficient?

Possible sentence stems

- _____ ones + _____ ones = _____ ones,
  so _____ ones – _____ ones = _____ ones
- _____ ones + _____ ones =_____ ones,
  so _____ tens + _____ tens = _____ tens

National Curriculum links

- Add and subtract numbers mentally, including:
  - a 3-digit number and ones
  - a 3-digit number and tens
  - a 3-digit number and hundreds

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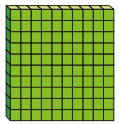
Make connections

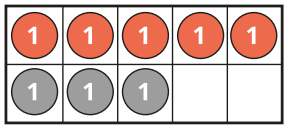
Key learning

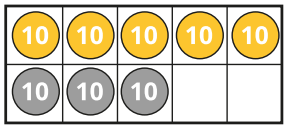
- Use base 10 to help you complete the sentences.

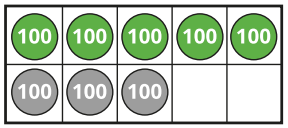
 = 1 hundred  = 1 ten = 1 one

- 10 ones = _____ ten
- 20 ones = _____ tens
- 30 ones = _____ tens
- 10 tens = _____ hundred
- 40 tens = _____ hundreds
- _____ tens = 6 hundreds

- Complete the addition sentences.



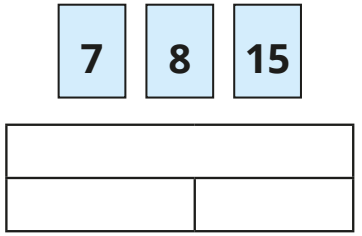


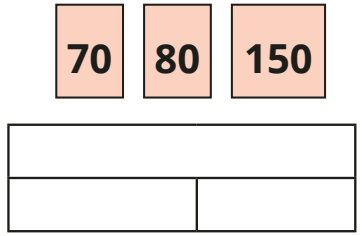


- 5 ones + 3 ones = _____ ones 5 + 3 = _____
- 5 tens + 3 tens = _____ tens 50 + 30 = _____
- 5 hundreds + 3 hundreds = _____ hundreds 500 + 300 = _____

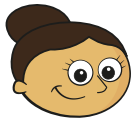
Write a subtraction number sentence for each ten frame.

- Use the number cards to complete the bar models.





Write the fact family for each bar model.

- 

I know that 13 – 6 = 7,
so I also know that 23 – 6 = 17
and 33 – 6 = 27

Use Dora's fact to work out the subtractions.

130 – 60	530 – 60	830 – 70	834 – 70

- 

I know that 90
is 10 away from 100, so
240 + 90 = 240 + 100 – 10

Use Mo's method to work out the calculations.

246 + 90	24 + 9	324 + 9	240 – 90	888 – 9

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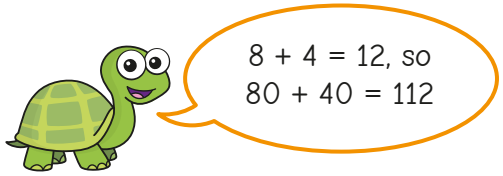
Make connections

Reasoning and problem solving



Do you agree with Tiny?

Explain your answer.

No

What could the missing number be?

263 + 60 < 319 + ☐ < 434 – 80

Find all the possible solutions.

any number between 5 and 34

Which number sentence is incorrect?

5 + 7 = 12	120 = 50 + 70
12 ones – 7 ones = 5 ones	
50 – 70 = 120	12 – 5 = 7
12 tens – 5 tens = 7 tens	

Write the correct sentence.

50 – 70 = 120

120 – 70 = 50 or
120 – 50 = 70 or
50 + 70 = 120

Tiny is working out the addition.

600 + 400

What has Tiny done well?

How could Tiny's answer be improved?

Tiny has found the correct number of hundreds, but 10 hundred is equal to 1,000

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Add two numbers (no exchange)

Notes and guidance

So far in this block, children have mentally added and subtracted 1s, 10s and 100s with 3-digit numbers. The focus now moves to written addition and subtraction. By the end of this small step, children will be able to add two numbers, either both 2-digit or both 3-digit, using the formal written method.

Children should be confident at placing 3-digit numbers into a place value chart before attempting to add and subtract numbers using the written method.

Base 10 and place value counters are used in a place value chart alongside the written method. No exchanges take place in this step, but it is a good idea to ask, "Do you have enough ones/tens to exchange for a ten/hundred?" as this will support their learning in future steps.

Things to look out for

- Children may not line the digits up correctly.
- Children may start adding from the hundreds or tens column, i.e. work from left to right – this will work in this small step, but should be avoided as it will not work when exchanges are required.
- Children may need help with placeholders when there are no tens or ones.

Key questions

- How can you represent the question using base 10?
- How can you put these numbers into a place value chart?
- Does it matter which columns you add together first?
- Do you have enough ones/tens to make an exchange?
- What do you put in the tens column if there are no tens?

Possible sentence stems

- _____ ones plus _____ ones is equal to _____ ones.
- _____ tens plus _____ tens is equal to _____ tens.
- _____ hundreds plus _____ hundreds is equal to _____ hundreds.
- _____ hundreds, _____ tens and _____ ones is equal to _____

National Curriculum links

- Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction
- Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction

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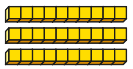
Add two numbers (no exchange)

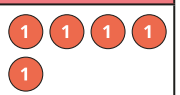
Key learning

- Find the sum of 34 and 23

	Tens	Ones
		
+		

	T	O
	3	4
+	2	3

- Find the sum of 345 and 432

	Hundreds	Tens	Ones
			
+			

	H	T	O
	3	4	5
+	4	3	2

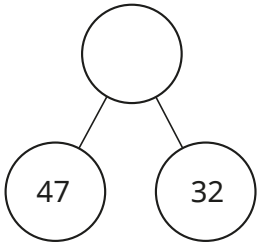
- Work out the additions.

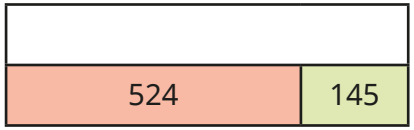
	T	O
	7	3
+	2	5

	H	T	O
	5	2	4
+	3	7	3

	H	T	O
	1	0	7
+	4	0	1

- Fill in the missing numbers.

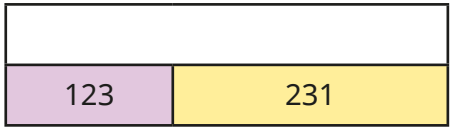




- Dora scores 123 points in a game.

  Ron scores 231 points in the same game.

  How many points do they score in total?



- 562 people go to a museum on Saturday.

  317 people go to the museum on Sunday.

  How many people altogether went to the museum at the weekend?

- The mass of a book is 145 g.

  A box is 230 g heavier than the book.

  What is the mass of the box?

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Add two numbers (no exchange)

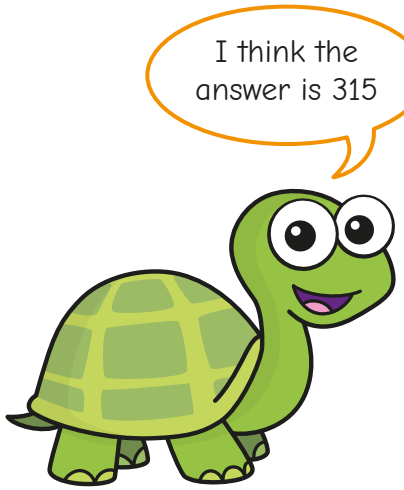
Reasoning and problem solving

Brett and Jack are playing a game.

Brett has 213 points.

Jack has 102 more points than Brett.

How many points do they have altogether?



What mistake has Tiny made?

528

Find the missing digits.

	2	3	+	4	5		=	6	7	9

What could the missing digits be?

	3	6	+		3	2	=	5	6	8

What could the missing digits be?

3	4	1	+	5	3		=	8	7	

2, 6

4, 1; 3, 2; 2, 3; 1, 4

1, 2; 2, 3; 3, 4; 4, 5; 5, 6; 6, 7; 7, 8; 8, 9

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Subtract two numbers (no exchange)

Notes and guidance

In the previous step, children used base 10 and place value counters in place value charts to add two 2-digit or 3-digit numbers. In this small step, they explore subtraction of 2-digit numbers and 3-digit numbers.

It is important that children continue to work with concrete resources alongside the formal written method. When using concrete resources, the key difference in this step is that they do not need to make the number they are subtracting, but instead physically remove it from the representation of the number they are subtracting from.

There are no exchanges in this step, but it is still worth asking the children, "Do you need to make an exchange?" in order to support future learning. The next few small steps involve addition and subtraction where exchanges are necessary.

Things to look out for

- Children may make the number incorrectly with base 10 or place value counters in a place value chart.
- Children may not line the digits up correctly in the formal written method.
- Children may physically create the second number (that is being subtracted), which could lead to confusion.

Key questions

- How can you put this number into a place value chart?
- Do you need to make both numbers before you can subtract?
- Does it matter which column you subtract from first?
- Do you have enough ones/tens to subtract _____ ones/tens?
- Do you need to make an exchange?
- Does it matter which number you write at the top when using the column method for subtraction?

Possible sentence stems

- _____ ones/tens/hundreds minus _____ ones/tens/hundreds is equal to _____ ones/tens/hundreds.
- Now there are _____ hundreds, _____ tens and _____ ones. The answer is _____

National Curriculum links

- Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction
- Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction

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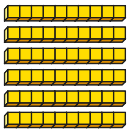
Subtract two numbers (no exchange)

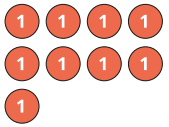
Key learning

- Work out 63 – 51

Tens	Ones
	

		T	O
		6	3
–		5	1

- Work out 769 – 147

Hundreds	Tens	Ones
		

		H	T	O
		7	6	9
	–	1	4	7

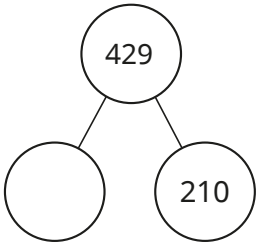
- Work out the subtractions.

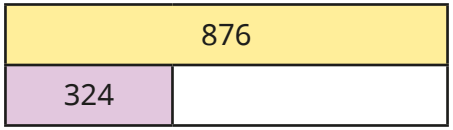
		T	O
		8	5
	–	2	4

		H	T	O
		3	2	8
	–	1	0	7

		H	T	O
		7	2	9
	–	3	0	9

- Work out the missing numbers.

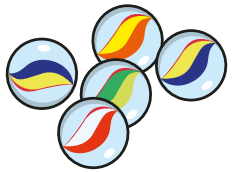




- Tom has 75 marbles.

  He gives 35 marbles to Amir.

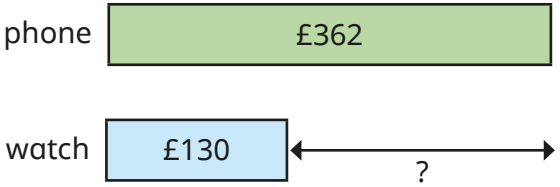
  How many marbles does Tom have left?



- A phone costs £362

  A watch costs £130

  How much more money does the phone cost than the watch?



What is the total cost of the phone and the watch?

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Subtract two numbers (no exchange)

Reasoning and problem solving

What could the missing digits in the subtraction be?

Find all the possible answers.

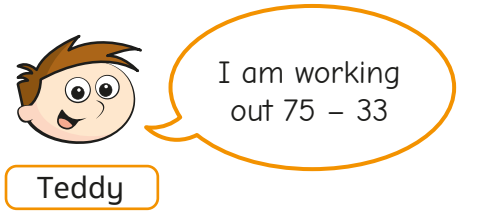
		H	T	O	
		6		6	
	–	2		4	
		4	2	2	

What is the pattern for the two missing digits?

Explain your answer.

9, 7; 8, 6; 7, 5; 6, 4; 5, 3; 4, 2; 3, 1; 2, 0

Teddy and Eva are both working out a subtraction.



Teddy's answer is double Eva's answer.

What could Eva's other number be?

Compare answers with a partner.

74 or 32

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Add two numbers (across a 10)

Notes and guidance

Children have already used the formal written method to add and subtract 2- and 3-digit numbers with no exchanges. In this small step, they again add two numbers, but now with exchanges into the tens: when the ones are added together, they will (sometimes) total more than 9

Both numbers are made using base 10 or place value counters in a place value chart. Children need to begin adding in the ones column, working from right to left. The use of manipulatives helps children to understand that if they have 10 or more ones, they can exchange them for a ten, which is added to the tens column. Exchanging with base 10 in a place value chart alongside the formal written calculation helps children to understand the value of the 1 that has been added to the tens column in the written method.

Things to look out for

- Children may start adding from the hundreds or tens column, i.e. working from left to right.
- When two digits sum to more than 10, children may put this number in the ones column instead of exchanging 10 ones for 1 ten.
- Children may forget to add the ten that has been exchanged for 10 ones.

Key questions

- Does it matter which column's numbers you add together first?
- Do you have enough ones to make an exchange?
- Where do you put the ten that you made from exchanging 10 ones in your model?
- How can you show that you have exchanged 10 ones in your written calculation?

Possible sentence stems

- _____ ones + _____ ones = _____ ones
- If I have _____ ones, I can exchange them for _____ ten and _____ ones.
- I have _____ hundreds, _____ tens and _____ ones, so altogether I have _____

National Curriculum links

- Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction
- Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction

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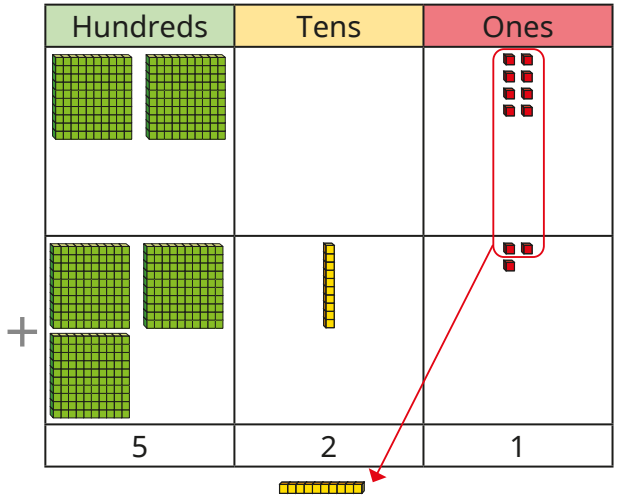
Add two numbers (across a 10)

Key learning

- Dexter uses base 10 to work out 208 + 313



	H	T	O
	2	0	8
+	3	1	3
	5	2	1
		1	

Use Dexter's method to work out the additions.

345 + 437	365 + 126	328 + 517

- Use place value counters to help you work out the additions.

	T	O
	6	4
+	2	8

	H	T	O
	7	1	9
+	1	5	3

	H	T	O
	5	6	1
+	2	1	9

- Scott cycles 204 miles in the first week of his summer holiday.

He cycles another 117 miles in the second week.

How many miles does he cycle in the first two weeks of his holiday?

- A tablet costs £329
  - A laptop costs £154 more than the tablet.

    How much does the laptop cost?
  - A TV costs £107 more than the laptop.

    How much does the TV cost?

- Fill in the missing digits.

	H	T	O
	2		3
+	1	6	
	3	7	0

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Add two numbers (across a 10)

Reasoning and problem solving

Is the statement true or false?

In this calculation, there will be no tens in the answer, because there are no tens in the numbers being added together.

		H	T	O	
		3	0	5	
	+	6	0	7	

Explain your answer.

False

Tiny is working out 325 + 417

		H	T	O	
		3	2	5	
	+	4	1	7	
		7	3	12	

Explain Tiny's mistake.

What is the correct answer?

742

Is the statement true or false?

If you add two numbers and there are enough ones to make an exchange, the answer will never have the digit 9 in the ones column.

Explain your answer.

True

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Add two numbers (across a 100)

Notes and guidance

In Year 2, children added two 2-digit numbers, exchanging 10 ones for 1 ten. In the previous small step, they did the same with 3-digit numbers. In this small step, they exchange 10 tens for 1 hundred.

Children make both numbers using base 10 or place value counters. They need to begin adding in the ones column, working from right to left. After adding each column, ask whether they need to make an exchange. Seeing 10 tens physically swapped for 1 hundred, alongside the formal written method, will deepen children's understanding of this step.

The main focus is on exchanging into the hundreds column, but children should continue to check for any exchanges from the ones into the tens column.

Things to look out for

- Children may forget to add the hundred that has been exchanged for 10 tens.
- When an exchange is needed, writing the 1 (the 1 hundred that comes from exchanging 10 tens) in the incorrect place could cause confusion.
- If two exchanges are needed, children may struggle to know what each digit they have "carried" represents.

Key questions

- Does it matter which column you add together first?
- Do you have enough ones/tens to make an exchange?
- Where do you put the hundred that you made from exchanging 10 tens in your model?
- How can you show that you have exchanged 10 tens in your written calculation?

Possible sentence stems

- _____ tens + _____ tens = _____ tens
- If I have _____ tens, I can exchange them for _____ hundred and _____ tens.
- I have _____ hundreds, _____ tens and _____ ones, so altogether I have _____

National Curriculum links

- Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction
- Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction

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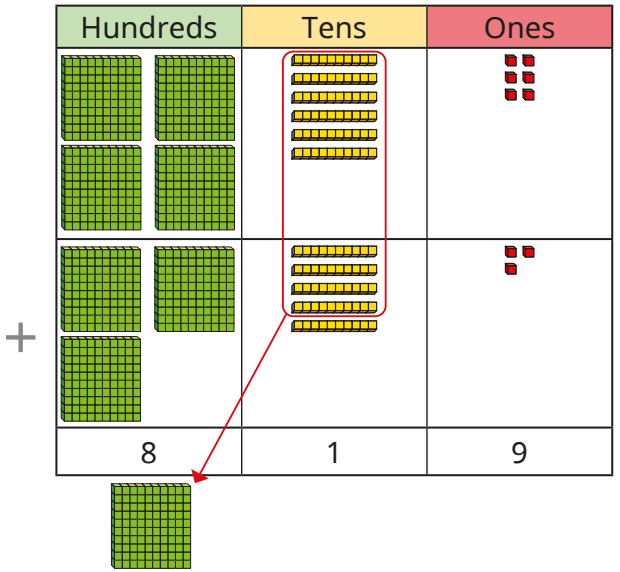
Add two numbers (across a 100)

Key learning

- Nijah uses base 10 to work out 466 + 353



		H	T	O
		4	6	6
+		3	5	3
		8	1	9
		1		

Use Nijah's method to work out the additions.

		H	T	O
		2	8	4
+		1	3	5

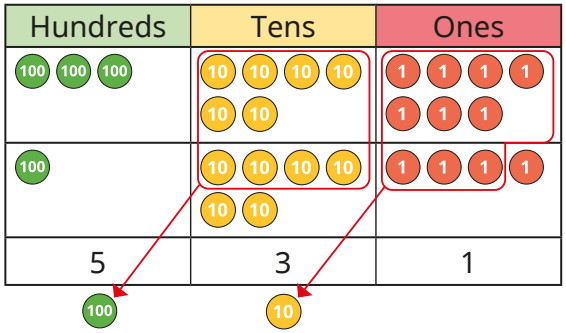
		H	T	O
		3	6	7
+		2	9	1

		H	T	O
		3	7	2
+		1	3	1

- Mrs Trent has £582 and Ms Rose has £136

  How much money do they have altogether?

- Ron uses place value counters to work out 367 + 164



		H	T	O
		3	6	7
+		1	6	4
		5	3	1
		1	1	

Use Ron's method to work out the additions.

		H	T	O
		2	5	6
+		1	8	3

		H	T	O
		6	2	5
+		2	9	4

		H	T	O
		3	5	3
+		2	4	7

- Work out 784 + 156

  How is this calculation different from 780 + 156?

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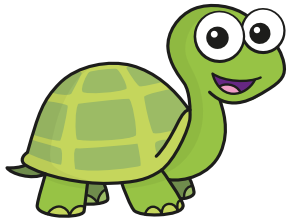
Add two numbers (across a 100)

Reasoning and problem solving

Tiny has completed an addition.

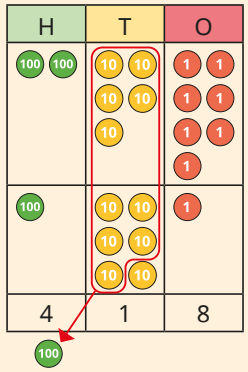


		H	T	O	
		2	5	7	
	+	1	6	1	
		3	1	8	

Is Tiny correct?

Explain your answer using base 10 or place value counters.

No



What could the missing digits be?

		H	T	O	
		4		3	
	+	1		5	
		6		8	

Explain your answer.

various possible answers, e.g. (from top to bottom)

5, 6, 1

3, 9, 2

Is the statement true or false?

> When adding 245 to 356 there will not be an exchange in the tens column because there are only 9 tens.

Talk about your answer with a partner.

False

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Subtract two numbers (across a 10)

Notes and guidance

So far in this block, children have completed the formal written method for addition with exchanges in both the tens and hundreds columns. They now move on to the written method for subtraction with exchanges. In Year 2, they subtracted a 2-digit number from a 2-digit number, exchanging 1 ten for 10 ones. In this small step, they subtract both 2- and 3-digit numbers, exchanging 1 ten for 10 ones.

As with addition in the previous steps, they use base 10 alongside the written calculation, but for subtraction they only need to make the number being subtracted from. For each calculation, prompt children to think about whether they need to make an exchange or not, and why.

Things to look out for

- When using base 10, children may create both numbers and simply remove the second number, leaving the original number unchanged.
- Children may find the difference between the two digits in a column instead of subtracting the second digit from the first, for example 1 – 3 becomes 3 – 1
- When no tens are left in a number due to an exchange, children may not know what to put in the tens column.

Key questions

- How can you show this question using base 10?
- Can you subtract 2 ones from 5 ones?
- Can you subtract 5 ones from 2 ones?
- Do you need to make an exchange?
- How can you show an exchange using base 10 or place value counters?
- How can you show an exchange using the written method?

Possible sentence stems

- _____ ones subtract _____ ones is equal to _____ ones.
- I will exchange 1 ten for _____ ones.
- Now I have _____ hundreds, _____ tens and _____ ones.
  The answer is _____

National Curriculum links

- Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction
- Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction

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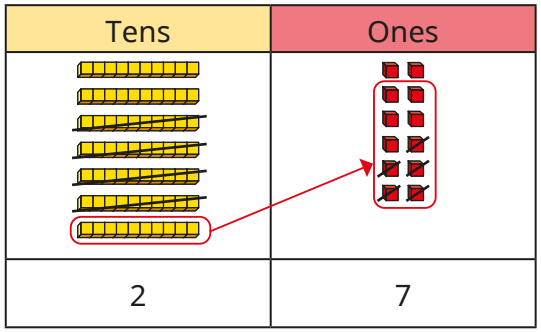
Subtract two numbers (across a 10)

Key learning

- Annie uses base 10 to work out 72 – 45



	T	O
	~~6~~ 7	12
–	4	5
	2	7

Use Annie's method to work out the subtractions.

	T	O
	6	2
–	1	8

	H	T	O
	3	2	5
–	1	1	9

	H	T	O
	3	2	1
–	2	0	3

- Tommy has £258

  He spends £139 on a new bike.

  How much money does he have left?

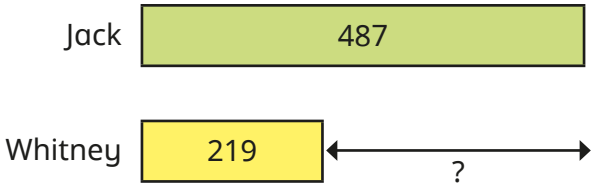
  Draw a bar model to help you solve the problem.

- Jack and Whitney are playing a game.

  Jack scores 487 points.

  Whitney scores 219 points.

  How many more points has Jack scored than Whitney?



  How many points have they scored in total?

- What are the missing digits in the subtractions?

	H	T	O
	4	~~6~~ 7	16
–	2	4	☐
	2	2	8

	H	T	O
	7	4	☐
–	☐	2	5
	5	1	6

	H	T	O
	4	1	8
–	3	0	☐
	1	☐	9

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Subtract two numbers (across a 10)

Reasoning and problem solving

Amir is working out 215 – 106

		H	T	O	
		2	1	5	
	–	1	0	6	
		1	1	1	

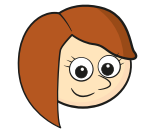
The answer is 111

What mistake has Amir made?

What is the correct answer?

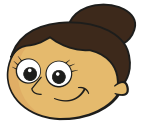
Amir has subtracted the 5 from the 6 in the ones column.

109



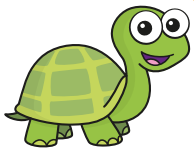
I have 534p.

Rosie



Rosie has 218p more than me.

Dora



I think Dora has 752p because "more" means "add" and 534 + 218 = 752

Is Tiny correct?

Explain your answer using a bar model.

No

Rosie has 218p more, so Dora has 218p less.

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Subtract two numbers (across a 100)

Notes and guidance

This small step will be children's first experience of subtraction across a 100, and they will use base 10 and place value counters to represent calculations alongside the written method. At each step of the subtraction, children should be asking whether they need to make an exchange.

This will be the first time children have seen multiple subtraction exchanges in the same calculation and extra care should be taken when modelling this. At this stage, both numbers are 3-digit numbers. In this small step, avoid subtracting from a number with no tens (causing an exchange from the hundreds down to the ones) as this will be covered later in the block.

Things to look out for

- When using base 10, children may create both numbers and simply remove the second number, leaving the original number unchanged.
- Children may find the difference between the two digits in a column instead of subtracting the second digit from the first, for example 1 – 3 becomes 3 – 1
- Children need to take extra care when two exchanges are happening in the same calculation. They may write digits in the wrong column.

Key questions

- How can you show this question using base 10?
- Can you subtract 2 tens from 5 tens?
- Can you subtract 5 tens from 2 tens?
- Do you need to make an exchange?
- How can you show an exchange from the hundreds using base 10?
- How can you show an exchange from the hundreds using the written method?

Possible sentence stems

- _____ tens subtract _____ tens is equal to _____
- I will exchange 1 hundred to make _____ tens.
- Now there are _____ hundreds, _____ tens and _____ ones.

  The answer is _____

National Curriculum links

- Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction
- Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction

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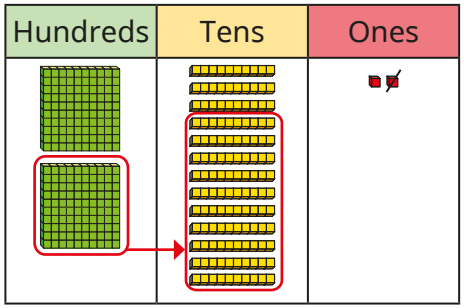
Subtract two numbers (across a 100)

Key learning

- Dani has started working out 232 – 141

  Complete the calculation.



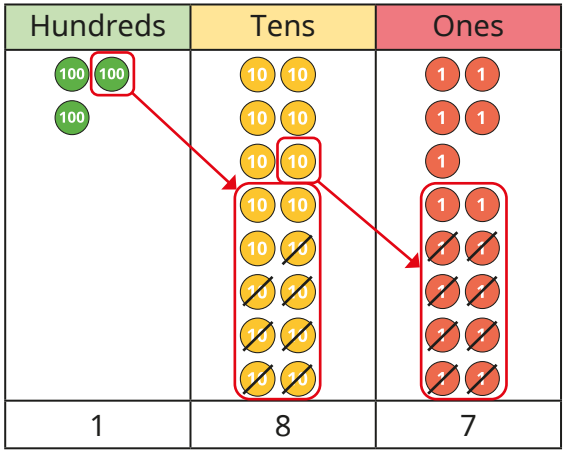
	H	T	O
	~~1~~2	~~1~~3	2
–	1	4	1
			1

  Use Dani's method to work out the subtractions.

  428 – 153 | 354 – 281 | 685 – 294 | 407 – 123

- Tom is using place value counters to work out 365 – 178

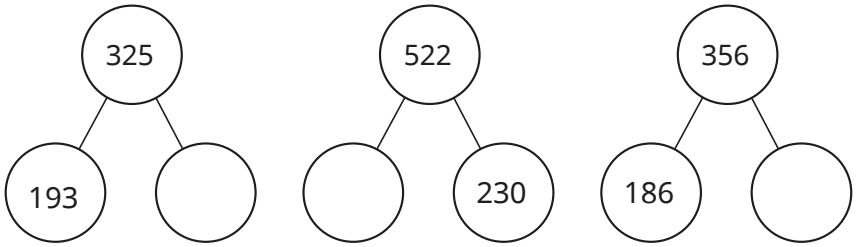
  He needs to make two exchanges.



	H	T	O
	~~2~~3	~~15~~6	~~15~~5
–	1	7	8
	1	8	7

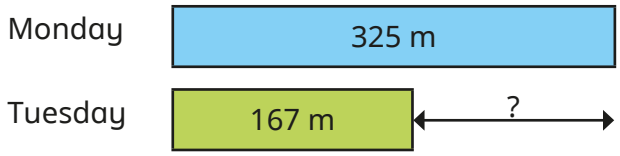
  Use this method to work out 435 – 159

- Complete the part-whole models.



- Alex walks 325 m on Monday and 167 m on Tuesday.

  How much further does she walk on Monday?



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Subtract two numbers (across a 100)

Reasoning and problem solving

Is the statement true or false?

In this calculation, there will be 1 hundred in the answer because 3 hundreds subtract 2 hundreds is equal to 1 hundred.

Hundreds	Tens	Ones
100 100 100	10	1 1 1 1 1

		H	T	O	
		3	1	5	
	–	2	2	1	

Explain your answer.

False

Annie, Mo and Ron are playing a game.

I have 437 points. I have 163 points more than Mo.

Annie

I have 182 points more than Ron.

Mo

How many points does Ron have?

92

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Add 2-digit and 3-digit numbers

Notes and guidance

Children should now be confident with the formal written method of addition of numbers with up to three digits and exchanges taking place from the ones and the tens. So far in this block, the numbers have all been both 2-digit or both 3-digit numbers. In this small step, children add a 2-digit number to a 3-digit number.

The different sizes of numbers can sometimes confuse children, especially when lining up the digits in place value columns. Some children may find it helpful to write a zero placeholder in the absence of any hundreds.

As before, the written calculation is done alongside concrete representations. When forming the 2-digit number with concrete resources, make sure children do not assume the greatest digit is in the hundreds column.

Things to look out for

- Children may line up the 2-digit number incorrectly below the 3-digit number, placing tens in line with the hundreds column.
- Children may be confused by a zero or no digit in any place value column.

Key questions

- How can you show this question using base 10/place value counters?
- How can you write this calculation using the formal written method?
- Have you put all the digits in the correct columns?
- Do you need to make an exchange?
- What could you write in the hundreds column if there are no hundreds?

Possible sentence stems

- _____ hundreds added to _____ hundreds is equal to _____ hundreds.
- I put _____ in the _____ column because ...

National Curriculum links

- Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction
- Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction

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Add 2-digit and 3-digit numbers

Key learning

- Work out the additions.

Hundreds	Tens	Ones
+		

		H	T	O	
		1	5	6	
	+		6	3	

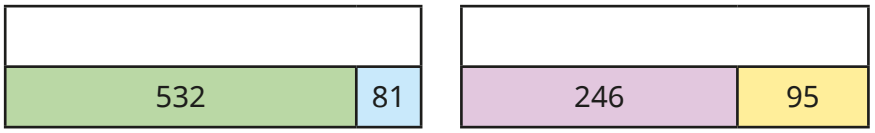
Hundreds	Tens	Ones
+		

		H	T	O	
		2	5	5	
	+		5	4	

- Work out the additions.

537 + 82	434 + 49	58 + 365	19 + 799

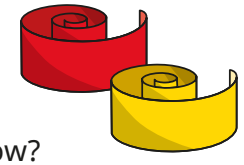
- Complete the bar models.



- Kim has 132 cm of ribbon.

  Her teacher gives her another 83 cm.

  What total length of ribbon does Kim have now?



- Tom has £283 and Esther has £68

  How much money do they have altogether?

- Nijah scores 376 points in a game.

  Scott scores 53 more points than Nijah.

  How many points do they score altogether?

- The mass of a mango is 175 g.

  An apple is 106 g lighter than the mango.

  What is the total mass of the mango and the apple?

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Add 2-digit and 3-digit numbers

Reasoning and problem solving

Which addition is the odd one out?

336 + 80	556 + 60
533 + 80	586 + 80

Explain your answer.

Children could choose any card with correct justification.

In jug A there is 261 ml of juice.

In jug B there is 143 ml of juice.

In jug C there is 89 ml of juice.

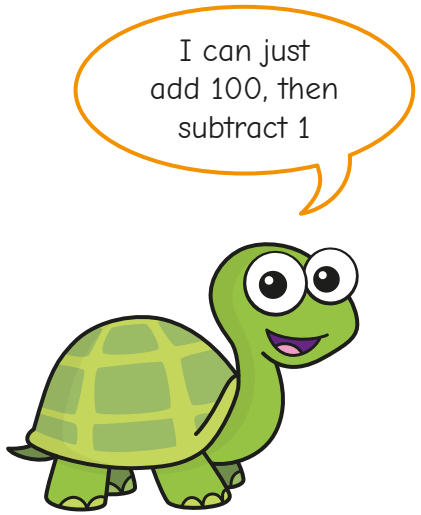
All the juice is poured into jug D.

How much juice is there in jug D?

In which order did you add them?

493 ml

Tiny is working out 546 + 99



Is Tiny correct?

Does this always work for adding 99?

How could Tiny use this method to add 98?

Yes

It will always work because 99 is one less than 100

To add 98, Tiny could add 100, then subtract 2

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Subtract a 2-digit number from a 3-digit number

Notes and guidance

Children should now be confident with the formal written method of subtraction of numbers with up to three digits and exchanges from the tens and hundreds. So far when subtracting in this block, the numbers have all been both 2-digit or both 3-digit numbers. In this small step, children subtract 2-digit numbers from 3-digit numbers.

The different sizes of numbers can sometimes confuse children, especially when lining up the digits in place value columns. Some children may find it helpful to write a zero placeholder.

This step will also be the first time that children exchange from the hundreds column to the ones column in a two-part exchange because there are no tens in the original number. Make sure children exchange 1 hundred for 10 tens before exchanging one of those tens for 10 ones.

Things to look out for

- Children may line up the 2-digit number incorrectly below the 3-digit number, placing tens in line with the hundreds column.
- When an exchange is needed from the tens, but there are no tens, children may try to exchange directly from the hundreds to the ones.

Key questions

- How can you show this question using base 10?
- How can you write this calculation using the formal written method?
- Have you put all the digits in the correct columns?
- Do you need to make an exchange?
- If you cannot exchange from the tens, what should you do?
- What could you write in the hundreds column if there are no hundreds?

Possible sentence stems

- _____ hundreds subtract _____ hundreds is equal to _____
- I will exchange 1 hundred for _____ tens, then 1 ten for _____ ones.

National Curriculum links

- Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction
- Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction

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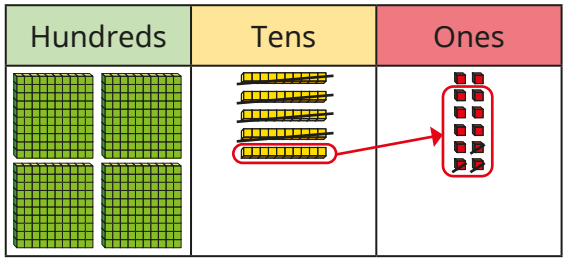
Subtract a 2-digit number from a 3-digit number

Key learning

- Teddy uses base 10 to work out 452 – 43



	H	T	O
	4	~~5~~ 4	12
–		4	3
	4	0	9

Use Teddy's method to work out the subtractions.

243 – 28 | 354 – 62 | 564 – 75 | 153 – 64

- Write <, > or = to compare the number sentences.

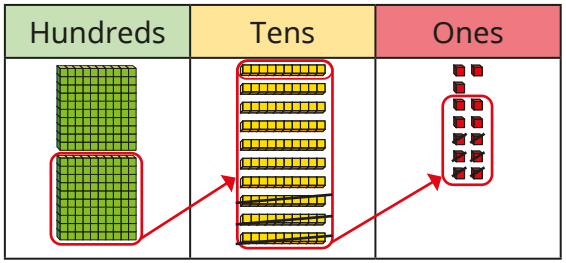
301 ◯ 327 – 28

522 – 131 ◯ 522 – 31

375 – 93 ◯ 324 – 51

243 – 58 ◯ 253 – 68

- Eva uses base 10 to work out 203 – 36



	H	T	O
	~~2~~ 1	~~0~~ 9	13
–		3	6
	1	6	7

Talk to a partner about Eva's method.

Use this method to work out the subtractions.

305 – 56 | 708 – 69 | 804 – 89 | 401 – 42

- Jack is 135 cm tall.

  Rosie is 27 cm shorter than Jack.

  How tall is Rosie?

- A computer costs £558

  Mrs Singh has £89

  How much more money does Mrs Singh need to buy the computer?

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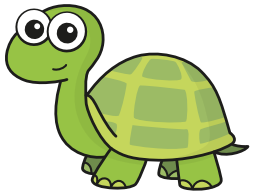
Subtract a 2-digit number from a 3-digit number

Reasoning and problem solving

Tiny is working out 526 – 31

		H	T	O	
		5	2	6	
	–	3	1		
		2	1	6	



Explain the mistake Tiny has made.

Find the correct answer.

Tiny has not put the 31 in the correct columns.

495

What are the missing digits?

13__ – 52 = 85

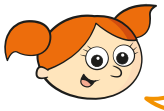
334 – __2 = 292

545 = 6__8 – 73

7

4

1



The rule for the function machine is "subtract 60".

input		output
567	→	497

Is Alex correct?

Explain your answer.

No

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Complements to 100

Notes and guidance

In this small step, children focus on fluently finding complements to 100

Previously in this block and in Year 2, children covered number bonds for ones to 10 and tens to 100, and this understanding can support finding complements to 100

A common misconception when finding a complement to 100 is to think that the ones digits bond to 10 and the tens digits bond to 100, which leads to a total of 110 rather than 100, for example 36 + 74. Using a hundred square can help children to avoid this misconception and to identify that they actually need to find a bond to 10 and a bond to 90. A number line can also support the development of efficient mental strategies to find complements to 100

This small step provides a good opportunity to recap prior learning on money, specifically the fact that there are 100p in £1

Things to look out for

- Children need to be able to fluently recall bonds to 10 and multiples of 10
- Children may find a bond to 10 and a bond to 100 and then add them together, leading to a total of 110

Key questions

- How many squares are there altogether? How do you know?
- How many full rows of each colour are there?
- What do you notice about the row with both colours in it?
- What do you notice about the total of the tens?
- What do you notice about the total of the ones?
- What is the jump to the next multiple of 10?
- What is the jump to 100?

Possible sentence stems

- I add _____ to get to the next 10, then _____ to get to 100
- This means _____ is the complement to 100 of _____
- _____ plus _____ is equal to 100

National Curriculum links

- Add and subtract numbers mentally, including:
  - a 3-digit number and ones
  - a 3-digit number and tens
  - a 3-digit number and hundreds

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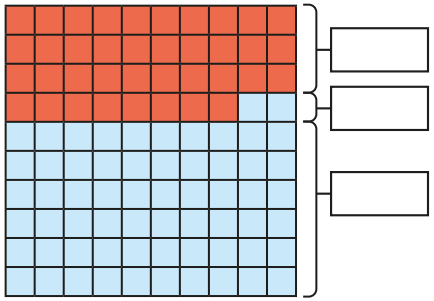
Complements to 100

Key learning

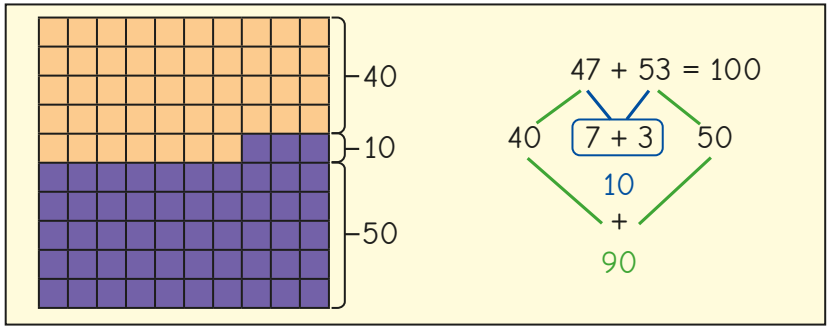
- Fill in the totals for the hundred square.



Use the hundred square to complete the number sentence.

38 + 62 = _____ + _____ + _____ = _____

- Dexter uses a hundred square to show that 47 + 53 = 100

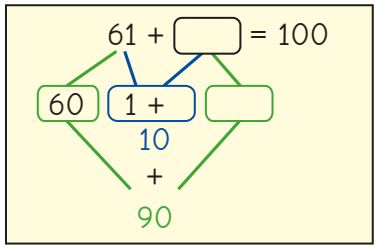


Use Dexter's method to show that the total of each addition is 100

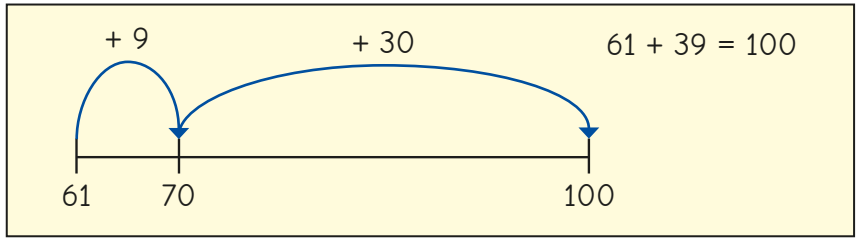
32 + 68	19 + 81	76 + 24

- Rosie is finding the complement of 61 to 100

Complete her workings.



Tommy uses a number line to find the complement of 61 to 100



Whose method do you prefer?

Use that method to find the complement of 58 to 100

- Complete the complements to 100

▸ 84 + 1__ ▸ 35 + __5 ▸ __7 + 53 ▸ 26 + _____

- A carpenter has a plank of wood that is 100 cm long.

She cuts off a piece of wood that is 39 cm long.

What length of wood is left?

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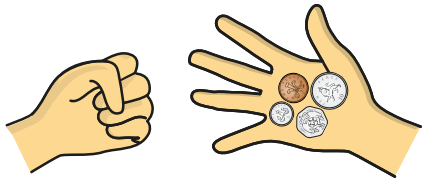
Complements to 100

Reasoning and problem solving

Annie has £1 in total in her hands.



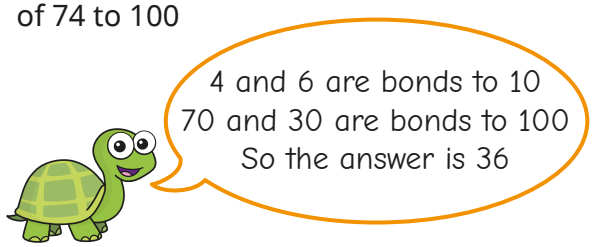
What coins could be in Annie's closed hand?

for example:

50p, 10p, 2p, 1p

The total is 63p.

Tiny is trying to work out the complement of 74 to 100



What mistake has Tiny made?

What is the correct answer?

26

Sort the additions into the table.

32 + 78	83 + 17	55 + 55	49 + 16
66 + 34	91 + 19	52 + 47	7 + 93

Bond to 100	Not a bond to 100

Explain your thinking to a partner.

Bond to 100	Not a bond to 100	
83 + 17 66 + 34 7 + 93	32 + 78 55 + 55 49 + 16	91 + 19 52 + 47

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Estimate answers

Notes and guidance

Although children have not explicitly been introduced to rounding, they have explored estimating the position of numbers on number lines in both Year 2 and Year 3 and will use this knowledge to support the learning in this small step.

Discuss with children why estimates are important, particularly in real-life situations such as population statistics. They allow us to quickly and easily get an idea of what an answer should be near to, or if an already calculated answer is appropriate.

It is important to discuss whether an actual answer will be greater or less than an estimate. For example, 33 + 54 may be estimated as 30 + 50, and we would expect the precise answer to be greater than the estimate because the actual numbers from the calculation are both greater than the "near numbers" used in the estimate.

Things to look out for

- Children may need support to identify the multiples of 10 or 100 either side of a number and to decide which multiple a number is closer to.
- Children may not always use the most appropriate values when estimating.

Key questions

- What are the multiples of 10/100 before and after _____?
- Where would _____ be on this number line?
- Which multiple is _____ closer to?
- How far from _____ is _____?
- Which calculation is easier/quicker to perform?
- Which calculations can you do mentally?
- Why do we use estimates?
- Is the estimate less than or greater than the actual answer? Why?

Possible sentence stems

- _____ is near to _____
- The estimated answer will be less/greater than the actual answer because ...

National Curriculum links

- Estimate the answer to a calculation and use inverse operations to check answers

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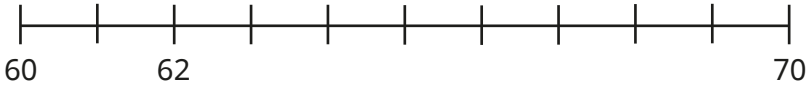
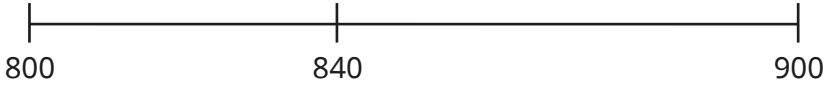
Estimate answers

Key learning

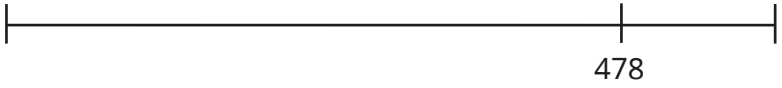
- Use the number lines to help you complete the sentences.



62 is closer to _____ than _____



840 is closer to _____ than _____



478 is closer to _____ than _____

- Work out the calculations.

▸ 80 + 30	78 + 33	
▸ 700 – 500	670 – 480	
▸ 200 + 100	240 + 120	237 + 118

In each set, which calculation was easiest to work out?

- Tommy is estimating the answer to 482 – 194

Use Tommy's method to estimate the answers to the calculations.

482 is close to 500
194 is close to 200
500 – 200 = 300

132 + 724	561 – 289	909 – 375	443 + 459

- Mr Hall has £560

Estimate whether Mr Hall can afford to buy both the laptop and the printer.

- Write < or > to complete the statements.

27 ◯ 30	27 + 49 ◯ 30 + 50
44 ◯ 40	44 + 72 ◯ 40 + 70
132 ◯ 130	400 – 132 ◯ 400 – 130
138 ◯ 140	400 – 138 ◯ 400 – 140

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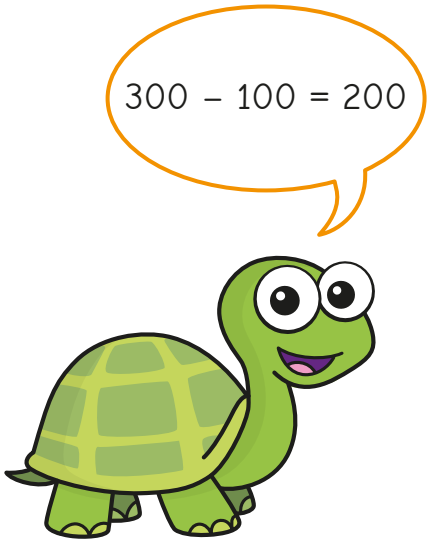
Estimate answers

Reasoning and problem solving

Tiny is estimating the answer to 382 – 114



Find a better estimate.

Work out 382 – 114

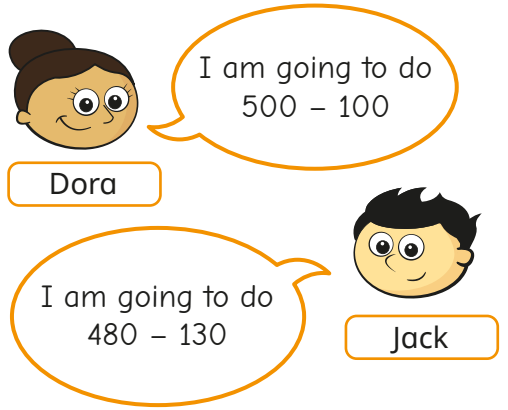
Which estimate is closer to the exact answer?

400 – 100 = 300, as 382 is closer to 400 than 300

268

400 – 100 = 300

Dora and Jack are estimating the answer to 476 – 128



Work out each estimate.

Whose estimate is easier to work out?

Work out 476 – 128

Whose estimate is closer to the actual answer?

Dora: 400
Jack: 350

352

Jack's estimate

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Inverse operations

Notes and guidance

In this small step, children explore the inverse relationship between addition and subtraction and how both relate to the part-whole structure.

In addition to part-whole models, bar models are excellent for highlighting these relationships. It is important to draw children's attention to the fact that they can perform two different subtractions as the inverse to an addition, due to addition's commutative property, but there is only one possible addition as the inverse to a subtraction.

Building on the previous small step, where children began to look at strategies to check answers using estimation, they can now use inverse operations as another method of checking, rather than simply redoing the same calculation and potentially repeating the same error.

Things to look out for

- Children may mix up the wholes and the parts.
- Children may subtract a part from a part rather than a part from the whole.
- When asked to check an answer, children may just repeat the same calculation instead of using the inverse operation.

Key questions

- What do you notice about the part-whole models?
- What are the two parts? What is the whole?
- What does "inverse" mean?
- What is the inverse of add/subtract _____?
- What does commutative mean?
- Is addition/subtraction commutative?
- What estimate could you use to check?

Possible sentence stems

- If _____ is a part and _____ is a part, then _____ is the whole.
- If _____ is the whole and _____ is a part, then _____ is the other part.
- The inverse of _____ is _____

National Curriculum links

- Estimate the answer to a calculation and use inverse operations to check answers

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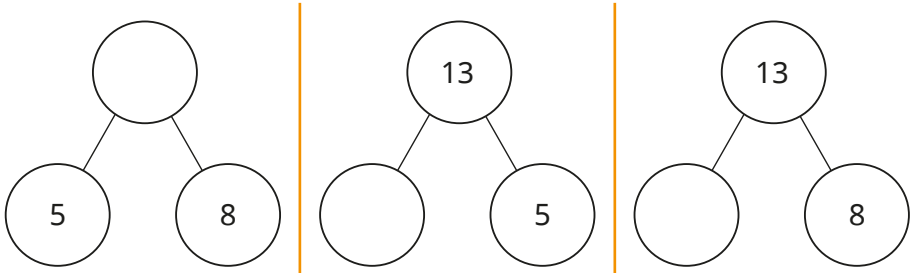
Inverse operations

Key learning

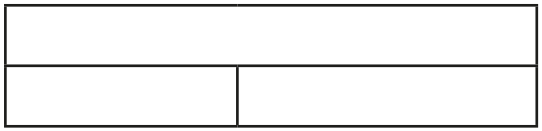
- Complete the part-whole models and number sentences.



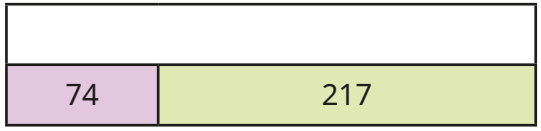
5 + 8 = _____ 13 – 5 = _____ 13 – 8 = _____

What do you notice?

- Complete the bar model for 561 – 236 = 325

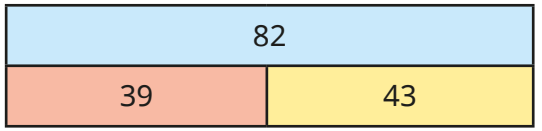


- Find the whole.



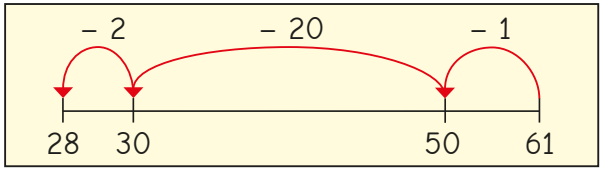
Write the fact family for the bar model.

- Dani works out 39 + 43 = 82



What two subtractions could Dani do to check her answer?

- Tiny uses a number line to work out 61 – 23



What addition could Tiny do to check the answer?

Find Tiny's mistake and correct it.

- Brett has answered this problem.
  - What two subtractions could Brett do to check his answer?
  - Work out the subtractions to check Brett's answer.
  - What estimate could Brett also use to check his answer?

Mr Rose is 198 cm tall.

Mrs Rose is 145 cm tall.

What is their combined height?

343 cm

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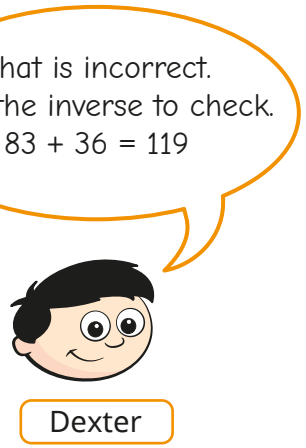
Inverse operations

Reasoning and problem solving

Aisha works out 83 – 47 and gets the answer 36



What mistake has Dexter made?

Complete an inverse operation to check that Aisha's answer is correct.

What estimate could Aisha and Dexter use to check their answers?

Dexter added the whole and a part, instead of adding the two parts, 47 and 36

47 + 36 = 83

80 – 50 = 30

Here are some calculations.

112 + 125	362 + 125	200 – 100	362 – 125
362 – 237	200 + 300	237 – 112	125 – 112
130 + 240	237 + 362	300 – 100	240 – 130

Which calculations can be used to check 125 + 237?

Which calculations can be used to check 237 – 125?

What could the other calculations be used to check?

check for 125 + 237:

362 – 125

362 – 237

130 + 240

check for 237 – 125:

112 + 125

200 – 100

237 – 112

240 – 130

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Make decisions

Notes and guidance

This small step provides the opportunity to consolidate and bring together all the learning from this block. Children are asked to make decisions about what operation and what method is appropriate to solve a problem.

Word problems, including mult-step problems, can be used to assess whether children are able to successfully identify the correct operation and information to use. Bar models can be an excellent tool to support children in this process, encouraging children to think about what is the whole and what are the parts.

It is also important to encourage children to make decisions around what is the most appropriate method to find an answer once the correct operation has been identified. The skills developed in the previous small steps should be revisited for children to check their answers.

Things to look out for

- Children may select the incorrect operation.
- Children may need support to identify the first step in a multi-step problem.
- Children may use written methods when mental methods would be more appropriate.

Key questions

- Do you know the whole?
- What parts do you know?
- Which operation do you need to use?
- Can you use a mental method or do you need to use a written one?
- Which method is more efficient?
- What does this arrow represent on the bar model?
- Where is the whole/total on the bar model?
- What is the first step you need to do?
- Do you have to complete the calculations in a specific order?

Possible sentence stems

- _____ is a part and _____ is a part, so I need to _____
- _____ is the whole and _____ is a part, so I need to _____

National Curriculum links

- Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction

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Make decisions

Key learning

- A machine packs 86 boxes on Saturday.

  Another 57 boxes are packed on Sunday.

  How many boxes are packed altogether?

  Draw a bar model to match the problem.

- There are 86 boxes in a factory.

  57 boxes are sent to a shop.

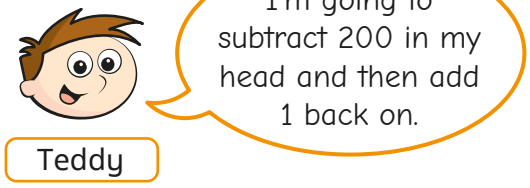
  How many boxes are left in the factory?

  Draw a bar model to match the problem.

- Kim and Teddy are working out 436 – 199

Kim's workings

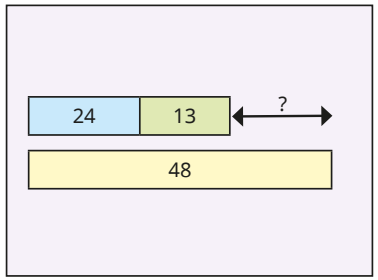
		H	T	O	
		4	3	6	
	–	1	9	9	



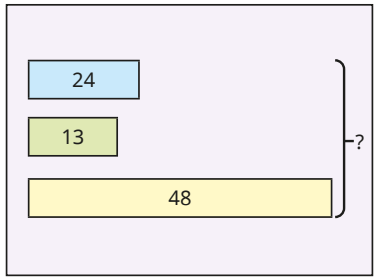
Use both methods to work out the answer.

Whose method is more efficient?

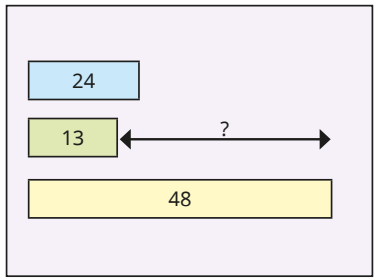
- Match the bar models to the problems.



Esther has 24 stickers.
Filip has 13 stickers.
Tom has 48 stickers.
How many stickers do they have altogether?



Esther has 24 stickers.
Filip has 13 stickers.
Tom has 48 stickers.
How many more stickers does Tom have than Esther and Filip combined?



Esther has 24 stickers.
Filip has 13 stickers.
Tom has 48 stickers.
Find the difference between Filip and Tom's numbers of stickers.

Solve each problem.

What else could you work out?

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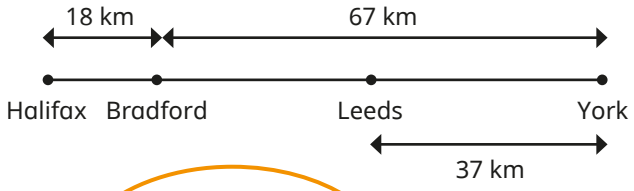
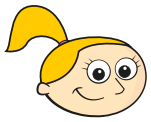
Make decisions

Reasoning and problem solving

Eva, Alex and Amir want to find the distance from Halifax to Leeds.





Eva

I'm going to use the written method to do 18 + 67 and then subtract 37

I can use mental strategies to subtract 37 from 67 first, and then add 18

Alex

You need to add 18, 67 and 37 together.

Amir

Whose method is incorrect?

What is the distance from Halifax to Leeds?

Alex's | 48 km

0	1	2	3	4
5	6	7	8	9

+	−

						=

Use the cards to create additions and subtractions that give an answer between 200 and 300

Compare answers with a partner.

various possible answers, e.g.

152 + 98 315 – 40 179 + 47 324 – 78

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