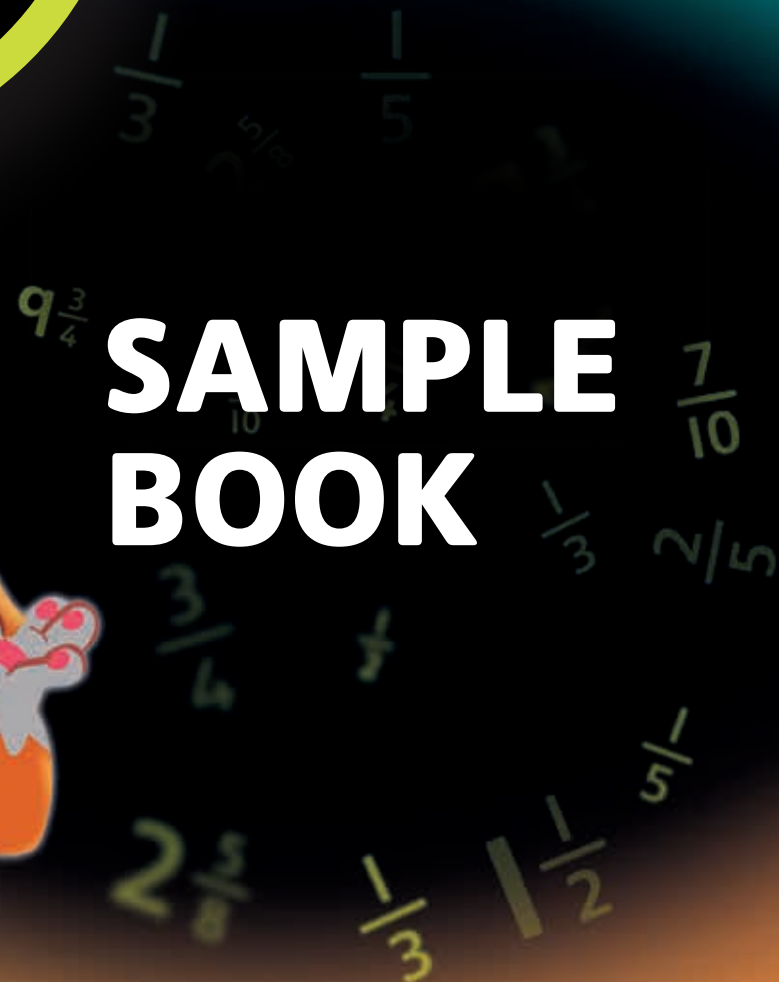


SAMPLE BOOK



New and improved based on teacher feedback!



Pearson

Reception Unit 5: Number bonds within 5

Teacher Guide sample pages	Page 3
Days 1–5 (Online Flashcards and Maths Journal pages)	Page 6

Year 1 Unit 3: Addition within 10

Teacher Guide sample pages	Page 12
Textbook sample pages	Page 18
Practice Book sample pages	Page 23

Year 2 Unit 2: Addition and subtraction (1)

Teacher Guide sample pages	Page 28
Textbook sample pages	Page 32
Practice Book sample pages	Page 37

Year 3 Unit 2: Addition and subtraction (1)

Teacher Guide sample pages	Page 42
Textbook sample pages	Page 46
Practice Book sample pages	Page 50

Year 4 Unit 3: Addition and subtraction

Teacher Guide sample pages	Page 54
Textbook sample pages	Page 58
Practice Book sample pages	Page 62

Year 5 Unit 3: Addition and subtraction

Teacher Guide sample pages	Page 66
Textbook sample pages	Page 70
Practice Book sample pages	Page 75

Year 6 Unit 2: Four operations (1)

Teacher Guide sample pages	Page 80
Textbook sample pages	Page 84
Practice Book sample pages	Page 88

Reception

Revised and updated for 2021 EYFS Framework

Unit 5 Number bonds within 5

Mastery Expert tip! "Tidy up time is a useful way to consolidate children's understanding of making groups of objects, especially in the home corner. Ask pairs of children to split a small group of items into two baskets or boxes by a set criteria of colour, shape, size or type."

Don't forget to watch the Exploring composition video!

Early Learning Goals

This unit supports the following ELGs:

→ Number ELG

Have a deep understanding of number to 10, including the composition of each number
Automatically recall numbers bonds up to 5 and some number bonds to 10, including double facts

WHY THIS UNIT IS IMPORTANT

This unit focuses on number bonds to 5 in the context of a part-whole model. This is the first time children have been introduced to the part-whole model and the idea that there are a limited number of bonds to a given number (5 in this case) and that if 2 and 3, for example, make 5, then so must 3 and 2. This is the basis of understanding addition and subtraction.

WAYS OF WORKING

Have concrete manipulatives, such as real or toy cakes, crayons, balls and ropes or cubes, available for children to recreate the images in the pictures.

WHERE THIS UNIT FITS

- Unit 4: Change within 5
- **Unit 5: Number bonds within 5**
- Unit 6: Space

In this unit, children will progress from finding one more and one less within 5 and putting objects into two groups, to using a part-whole model to represent the groups and the bonds to 5.

Link to Key Stage 1

Number – number and place value

- count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number; count, read and write numbers to 100 in numerals; count in multiples of twos, fives and tens
- identify and represent numbers using objects and pictorial representations including the number line, and use the language of: equal to, more than, less than (fewer), most, least

Number – addition and subtraction

- represent and use number bonds and related subtraction facts within 20

This unit underpins the KS1 objectives for accurate counting and forms the basis for an understanding of addition and subtraction facts. It also introduces the part-whole model as a way of representing number bonds pictorially.



ASSESSING MASTERY

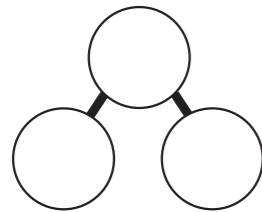
Children who have mastered this unit will be able to:

- use the language of wholes and parts
- use physical differences and number bonds to 5 to split a whole into two parts.

COMMON MISCONCEPTIONS	STRENGTHENING UNDERSTANDING	GOING DEEPER
When using the vocabulary <i>whole</i> , children may confuse the meaning with the word <i>hole</i> , as in 'a hole in the ground'.	Use every opportunity to talk about wholes and parts. Ask: <i>What is the whole of the class?</i> [All of us.] <i>What are the parts of the class?</i> [Each child or group of children, such as those who walk to school and those who do not or the 4-year-olds and 5-year-olds.]	Encourage children to explore the classroom environment to find sets of objects that can be split up into two distinct groups.
When counting the parts in a part-whole model to find the whole, children may include the whole in their count.	Encourage children to count out loud, using concrete manipulatives such as cubes or wooden blocks to represent the whole, and then move them into the separate parts. Ask: <i>Where is the whole on this model? Where are the parts? How many parts make this whole?</i>	Encourage children to explore how many different ways sets of up to 5 objects can be split into two parts, then three parts. <i>Are there still 5 objects?</i>

STRUCTURES AND REPRESENTATIONS

Part-whole model: This model helps children visualise bonds to 5, understanding that pairs of numbers combine to make a total of 5.



Multilink cubes: Multilink cubes provide a physical representation of an amount, which children can handle and move as they count to support splitting a quantity into two parts.

**RESOURCES**

Mandatory: multilink cubes, hula hoops

Optional: ball, bowling pins, playdough, candles (in two colours), bean bags, pens, pencils, digit cards

TEACHING TOOLS

part whole

KEY LANGUAGE

There is some key language that children will need to know as part of the learning in this unit.

- one, two, three, four, five, 1, 2, 3, 4, 5
- group, **parts**, **whole**, part-whole model
- how many, count/counting, more than
- same, different

Introducing the part-whole model**Learning focus**

This week, children will be introduced to the vocabulary of *whole* and *part*, and practise the concept of breaking a whole into parts using a part-whole model.

Small steps

- Previous step: One less
- **This step: Introducing the part-whole model**
- Next step: Spatial awareness

COMMON MISCONCEPTIONS

When using the vocabulary *whole*, children may confuse the meaning with the word *hole*, as in 'a hole in the ground'. Ask:

- *What is the 'whole' of the class?* [All of us.] *What are the parts of the class?* [Each child or group of children, such as those who walk to school and those who do not or the 4-year-olds and 5-year-olds.]

When counting the parts in a part-whole model to find the whole, children may include the whole in the count. Encourage children to count out loud, using concrete manipulatives such as cubes or wooden blocks to represent the whole and parts. Ask:

- *Where is the whole on this model? Where are the parts? How many parts make this whole? Do you need to count the whole as well?*

KEY LANGUAGE

In lesson: one, two, three, four, five, 1, 2, 3, 4, 5, group, **whole**, **parts**, how many, counting

Other language to be used by the teacher: part-whole model, count, same, different, more than

STRUCTURES AND REPRESENTATIONS

part-whole models, multilink cubes

RESOURCES

Mandatory: multilink cubes, hula hoops

Optional: balls, bowling pins, playdough, candles (in two colours), bean bags, hoop, pens, pencils, skipping ropes, digit cards

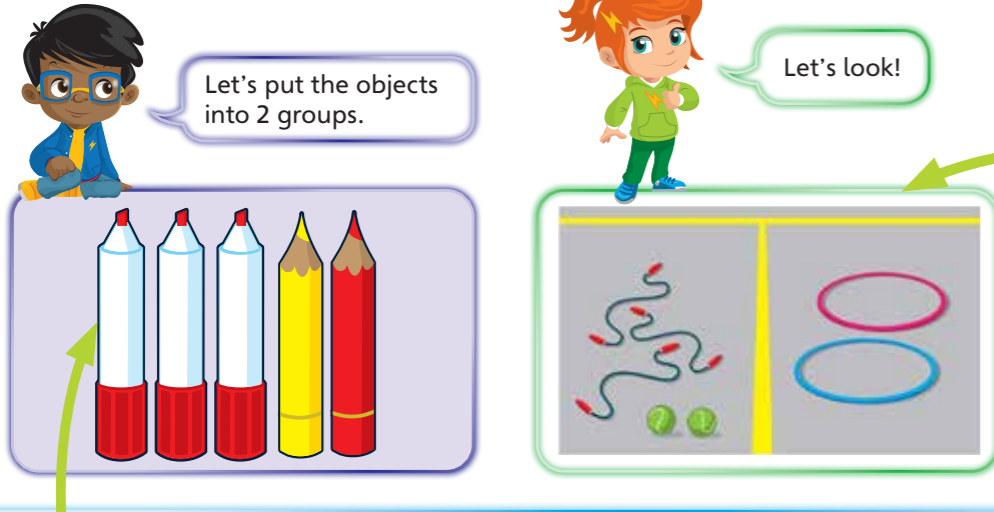
EXPLORE

Taking every opportunity throughout the school day to build and reinforce mathematical concepts gives children's learning purpose and meaning in the wider context of their lives.

ACTIVITY	AREA	DESCRIPTION	RESOURCES
Bowling	Inside or outside space	Set up a bowling activity using up to 5 items. Ask children to partition the items that are left standing and those that fall over. Spark discussion about the whole and the parts.	Ball, bowling pins
Playdough birthday cakes	Messy play area	Make sets of up to 5 playdough cakes, decorating each cake with one candle, using two different colours of candle. Encourage children to draw or complete part-whole models to show the two colours.	Playdough, sets of candles in two colours
Bean bag throwing	Inside or outside space	Choose a small number of bean bags (up to 5). Ask children to attempt to throw all 5 bean bags into a hula hoop. Next, ask children to count how many land in the hoop and how many miss. Ask: <i>How many bean bags did you start with? How many landed in the hoop? How many missed? How can you put the bean bags into two groups or parts?</i>	Bean bags, hula hoop

Unit 5 Number bonds within 5

Introducing the part-whole model



Introduce the week's concept and language with a practical activity, game, song or story.

Use Online Flashcard to check children are secure with pre-requisite skills before introducing a new concept.

Unit 5: Number bonds within 5, Week 10: Introducing the part-whole model

Day 1

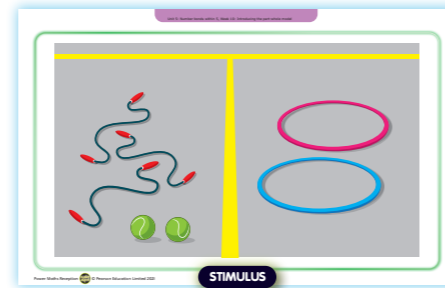
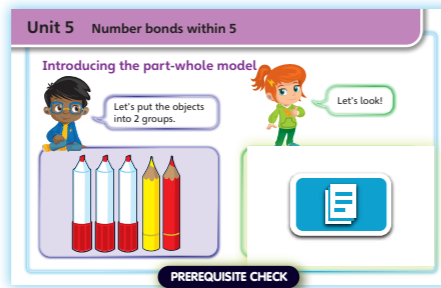
Learning focus

Splitting a group of objects into two groups

Before you teach II

- Are all children able to count to 5 confidently?
- Are children confident using vocabulary such as *more, fewer, same* and *different*?

Starter



PREREQUISITE CHECK Recognising that a group of objects can be split into smaller groups. You may like to use the optional Sorting Unit 19 to give children ideas on how to split the group.

WAYS OF WORKING Whole class
Where possible, give children access to pens and pencils, encouraging them to physically place them in two groups, or parts, and then back into a whole.

IN FOCUS Children practise splitting a group of objects into two smaller groups. They could choose to put the 3 pens in one group and the 2 pencils in another. Or they could split the group into red and yellow.

ASK
• What objects are shown here?
• Which group has more of? Which group has fewer of?

STIMULUS Picture to prompt a guided activity
The picture shows objects and empty hoops as an introduction to the parts in a part-whole model.

WAYS OF WORKING Whole class or small groups
Spark children's interest with the **Stimulus** activity. Encourage children to discuss how to split the objects into two parts (the hoops), anticipating the layout of a part-whole model that they will be introduced to in the **Discover** activity.

IN FOCUS The focus of the **Stimulus** is to move children towards using a part-whole model. An important step here is the introduction of the language of *parts* and *whole*.

Encourage mastery of the concepts of parts and wholes by using every opportunity to identify a whole and its parts in everyday contexts, and how parts can go back together to make the whole, and then break up again to go back into parts. See the table on page 66 for more activity.

Discover



Move the donut and the cupcake into 2 parts.

Children **Share** their ideas and work through a modelled answer that uses a CPA approach.

Children **Discover** the concept by attempting a practical problem set in a real-life context.

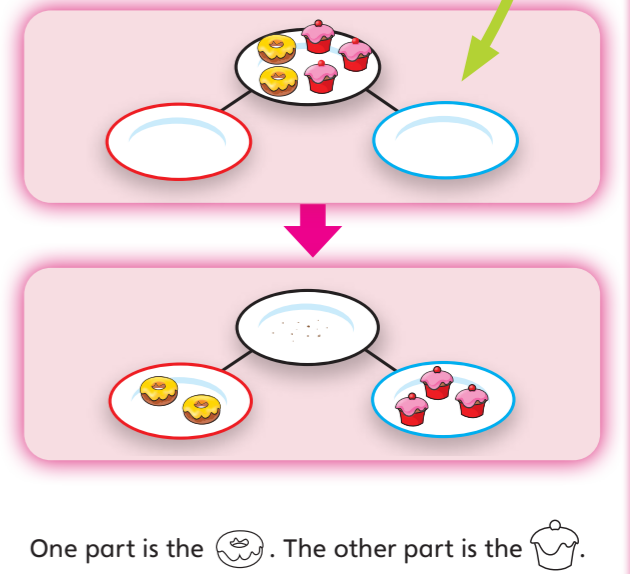
Share

Move the donut and the cupcake into 2 parts.



I can see a way to make the parts.

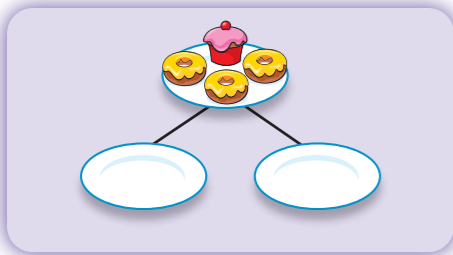
I can use numbers to show the parts.




One part is the donut. The other part is the cupcake.

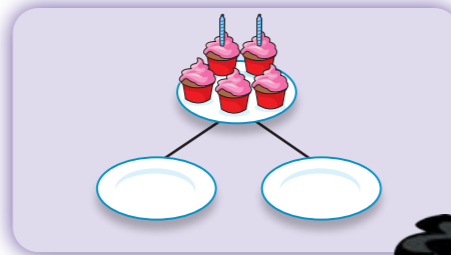
Think together

1 Break the whole into 2 parts.



I will use  to help me.

2 Break the whole into 2 parts.



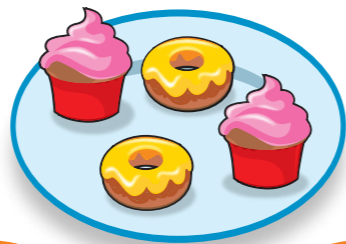
I can see a way to make 2 parts.

The **Maths Journal** provides independent practice. Children draw, talk it through, or use concrete objects to show their understanding.

Think Together provides guided practice and moves children on a step.

Practice

Break the whole into 2 parts.



Using real objects, counters or pictures, the child puts a group of objects on each plate, for example, 2 cupcakes on 1 plate and 2 doughnuts on the other.

A child who has mastered the concept will be able to explain that the whole is all of the cakes and the parts are the doughnuts and the cupcakes.

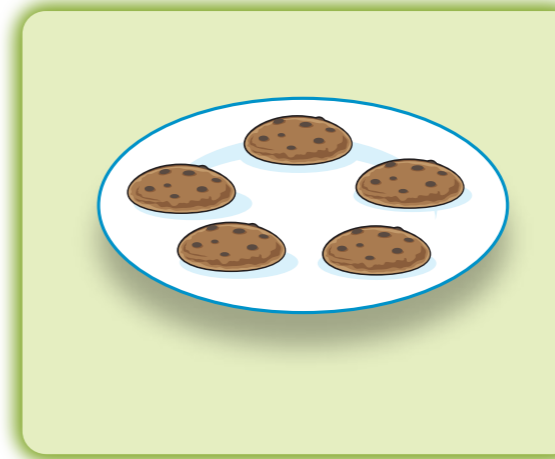
Number ELG: Have a deep understanding of number to 10, including the composition of each number. Automatically recall number bonds up to 5 and some number bonds to 10, including double facts.

Ask: **Strengthen:** What is the whole? How many cakes represent the whole? How many parts are there? How could you break the whole into the parts? Where is the first part? What could you put in the first part? Show me the second part. When you have made the parts, how many are left in the whole?

Deepen: Is there more than one way to make the two parts? Does there have to be the same number of cakes on each plate? Can there be different types of cake on the same plate? What else could you use?

CHALLENGE

Break the whole into parts.



I think there is more than one way to do this.



I will find all the ways to do this!



The **Teacher Guide** provides activity ideas to support those who are not yet ready to tackle the challenge independently, to help keep the class together.

The whole class attempt the **Challenge**, which deepens children's understanding.

Day 4

Learning focus

Finding different ways to break groups into parts

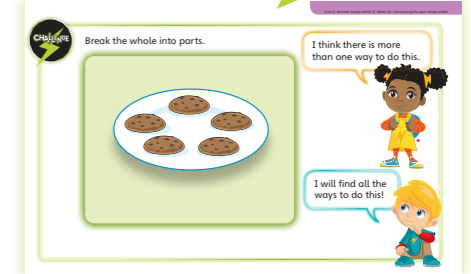
Challenge

WAYS OF WORKING Whole class or in pairs. Guide children who need more support, using cubes or blocks to represent the biscuits. Prompt thinking using the **Ask** questions. Some children may find it helpful to work in pairs. Use the **Part whole teaching tool** to model physically breaking a whole of 5 into parts.

IN FOCUS In this **Challenge**, all the items in the picture are identical so that children need to choose how to split them without the support of having obvious groups. Without any physical differences, children now attempt to split the biscuits by amount, using their knowledge of number bonds to 5. Encourage children to discover for themselves that there is more than one way to break the whole into parts, for example, 1 and 4, 2 and 3, etc.

- ASK**
- What is the whole? What is the same? Can you see any differences? How else could you break the whole into parts?
 - Is there more than one way to do this? How will you find out? What could you use to help you?
 - How do you know that there is more than one way? Work with a partner to find all the ways.

STRENGTHEN Work closely with children who need more support attempting this **Challenge**, ensuring they have access to concrete manipulatives that they can physically move to represent different number bonds to 5. Encourage children to count out loud as they work.



DEEPEN The **Challenge** question has purposefully not guided children to breaking the whole into a specific number of parts, but has left the number of parts to split the whole into as an open question. Children who have fully mastered the concept may be able to suggest the idea of separating the whole into more than two parts. Encourage them to try this, and ask questions such as: *What is the whole? What are the parts? Is there another way you could do this? What happens if you break the whole into three parts? Does the whole stay the same, no matter how many parts you break it into?*

Day 5

Learning focus

Finding number bonds to 3, 4 and 5

Practical activities

WAYS OF WORKING Whole class

IN FOCUS This activity builds on recognising and identifying the parts and the whole and encouraging children as much as possible to use the language of *whole* and *parts* when describing what they are doing. Prompt children with stem sentences from the **Online Flashcard** as much as possible to reinforce the accurate use of this key language. For example: *The whole is ... the parts are ...*

GET ACTIVE Hoops

Outside or in the hall, put hula hoops on the ground laid out like a part-whole model; one hoop at the top and two hoops below. Ask a group of 5 children to stand in the 'whole' hoop. Ask the other children to suggest how they could be split into two parts (long hair or short hair, age 4 or age 5). Ask the 5 children to split the group into the two parts suggested. Repeat with a different group of 5 children, using different criteria for the split. Split the class into groups of 3, 4 or 5 children. Ask them to count how

many are in their group. Prompt thinking with questions, such as: *Is that the whole or the part? How can you divide your group into two parts? How many children is the whole for your group?* Ask children to stand in the two hoops that represent the two parts of their whole. Encourage them to use stem sentences: *The whole is 4; the parts are 2 and 2.* Use every opportunity to describe what they are doing, to help embed this key language of *whole* and *parts*.

Split!

Put children into groups of 3 or 4. Draw a large part-whole model with chalk on the floor. Ask the group to stand in the whole circle. Explain that when you shout "SPLIT!", the children must split themselves into two parts. Once children have jumped/run/hopped into their parts, ask them to identify what number bond they have shown. If there are multiple groups playing, you could get the children to look for what's the same and what's different about their splits/number bonds.

Children show the depth of their understanding in an open-ended **Reflect** activity.

Reflect: Journal 2

WAYS OF WORKING Independent thinking

IN FOCUS As in the **Challenge** activity, this **Reflect** activity focuses on splitting a whole when all the parts are identical, requiring children to break the whole using number bonds to 4 – for example, 3 in one part, 1 in the other part – and prompting children to find all possible number bonds to 4. Children are not guided towards two parts, so the possibilities of ways to make the parts are much greater, giving opportunity for broader and more creative thinking. Children may need to be told that they are allowed to break the whole into more than two parts.

MASTERY CHECKPOINT Children who have mastered this concept can confidently use the language of *whole* and *parts* and can use physical differences and number bonds to 5 to split a whole into two parts.

Children who have not yet mastered this concept need support and prompts to break a whole into two parts.

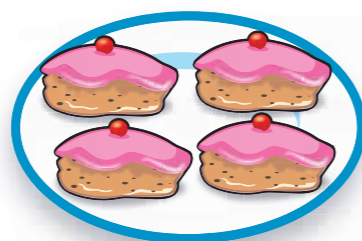
Children who fully understand this concept may want to try all the ways of splitting the whole into parts (possibly including using more than two parts) and can explain, when prompted, how they know this.

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Reflect

Unit 5: Number bonds within 5, Week 10: Introducing the part-whole model

Break the whole into parts.



I will use  to help me.



Strengthen: What is the whole? Show the whole with counters or cubes. How could you split them into parts? Is there another way to make the parts? [For example, '3 and 1' and '1 and 3'.]
Deepen: Can you show other ways to break the whole into two parts? Have you found all the ways? What if the whole was 3? Are there other ways to break the whole?

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Notes on each journal page guide Teachers and Teaching Assistants to provide support and greater depth.

Year 1

Unit 3: Addition within 10



Unit 3

Addition within 10

Mastery Expert tip! 'When I taught this unit, I used the characters within the Pupil Books to encourage children to talk about the different methods they were using. This worked well and helped us explore different ways of working. It also encouraged children to talk openly about mistakes.'

Don't forget to watch the Unit 3 video!

WHY THIS UNIT IS IMPORTANT

This unit builds on the work on number bonds within 10 from the previous lesson. It is important that children become fluent in these facts, because they are the foundation for future number facts.

Within this unit, children are introduced to formal addition for the first time through the idea of 'count all' and 'count on' strategies. A 'count all' strategy is when all parts are added together to make a whole. A 'count on' strategy asks children to start with a number and count on.

As well as introducing children to some of the key language associated with addition, children will also begin to develop an understanding of the commutativity of addition – the idea that addition calculations can be performed in any order.

ASSESSING MASTERY

Children who have mastered this unit will be able to relate each number in a calculation to what it represents. Children will be able to use a variety of manipulatives to represent addition within 10, including cubes, ten frames, number lines and part-whole models.

Children's confidence in knowing and recognising number facts and number pairs will also start to increase, and children will start to use these to answer simple calculations without manipulatives.

Additionally, children showing mastery would be able to rearrange the order of a calculation to work efficiently, using their knowledge of commutativity.

WHERE THIS UNIT FITS

- Unit 2: Part-whole within 10
- **Unit 3: Addition within 10**
- Unit 4: Subtraction within 10

This unit builds on Unit 2: Part-whole within 10, which introduced children to the idea that a whole can be separated into parts of various sizes. Unit 3 focuses on addition within 10.

Before they start this unit, it is expected that children:

- can use the part-whole model to partition a number to 10
- can write and compare number bonds to 10.

COMMON MISCONCEPTIONS	STRENGTHENING UNDERSTANDING	GOING DEEPER
Children may not apply number facts and therefore resort to a 'count all' or 'count on' strategy.	Repeat the number fact after counting objects and remind children that they do not need to count each time.	Ask children to solve missing number problems or to create their own number story.
Children may struggle with the transition from a 'count all' to a 'count on' strategy.	Remind children that we start at the first number, but then count on from there. Count each jump together.	Remember to use numbers within 10. It is important to deepen learning rather than moving children on.

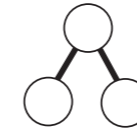
Unit 3: Addition within 10

UNIT STARTER PAGES

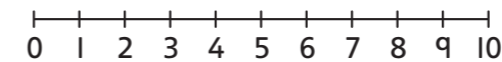
Use these pages to introduce the unit focus to children. You can use the characters to explore different ways of working.

STRUCTURES AND REPRESENTATIONS

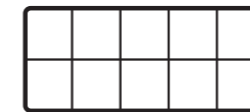
Part-whole model: This model helps children understand that two or more parts combine to make a whole. It also helps to strengthen children's understanding of number bonds within 10.



Number line: Number lines help children learn about addition as counting on. They allow children to identify the starting point, the number counted on and the end point.



Ten frame: The ten frame helps to give children a sense of 10, and supports their understanding of number bonds to 10. It also plays a key role in helping children to recognise the structure of other numbers, and to understand what happens when you add two numbers together.



KEY LANGUAGE

There is some key language that children will need to know as part of the learning in this unit.

- part, whole and part-whole
- altogether, in total, total, sum
- add, added, plus, or +
- count, count on
- missing, missing part
- number bonds, number pairs
- number stories

Unit 3

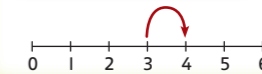
Addition within 10



In this unit we will ...

- ✦ Add parts to find the whole
- ✦ Add more
- ✦ Find a missing part
- ✦ Solve word problems

Do you remember what this is called? Use it to find one more than 3.



PUPIL TEXTBOOK 1A PAGE 98



We will need some maths words. Which ones mean the same thing?

altogether (say 'all-too-geth-er')

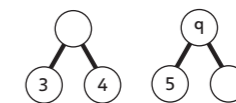
in total add added

missing part count on

number stories



We will use a part-whole model too. Use these to make number sentences.



PUPIL TEXTBOOK 1A PAGE 99

Addition problems

Learning focus

In this lesson, children will find solutions to simple word and picture problems involving additions to 10.

NATIONAL CURRICULUM LINKS

Year 1 Number – addition and subtraction

Solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as $7 = \square - 9$.

ASSESSING MASTERY

Children can find number stories in pictures and use addition to answer questions. Children can represent contexts using addition calculations and explain the meanings of the parts of their calculations.

COMMON MISCONCEPTIONS

The number of objects in the pictures are not always represented in an ordered way, which may encourage children to go back to counting from 0 to find the total. Draw links from previous lessons and model that once you have found how many objects are in one group, you can use that number to count on. Ask:

- How many groups can you see?

STRENGTHENING UNDERSTANDING

The contexts explored in this lesson show that number stories and number sentences describe the real world, in a similar way to that in which words and pictures do. Strengthen understanding by encouraging children to come up with their own context for one of the calculations. For example, instead of 6 jam tarts + 3 jam tarts, they could use 6 bears + 3 bears.

GOING DEEPER

Encourage children to explore this lesson in more depth by asking them to make up their own word problem, and to draw a picture that represents it, with the matching calculation alongside.

KEY LANGUAGE

In lesson: number stories, altogether, count, in total

Other language to be used by the teacher: parts, whole, addition calculation, greater than

STRUCTURES AND REPRESENTATIONS

Part-whole model, number line

RESOURCES

Mandatory: blank part-whole models, number lines

Optional: classroom objects / PE equipment



In the eTextbook of this lesson, you will find interactive links to a selection of teaching tools.

Before you teach II

- Are children confident with the fundamental concept that two parts join together to make a whole, and recognise it on a part-whole model and in an addition calculation? If not, the real life contexts in this lesson may help children.
- What links could you make with other curriculum areas? Could curriculum links help children to compose their own word problems?

Quick recap

Play addition bingo. Ask children to pick four numbers between 0 and 10. Write some addition calculations that have answers between 0 and 10. If children have the answer, they cross it off.

Discover

WAYS OF WORKING Pair work

ASK

- Question 1 a): What do the 4 and the 4 mean?
- Question 1 b): Where on the picture can you see 1 person with 3 other people?

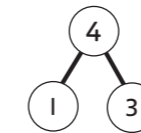
IN FOCUS The picture contains lots of hidden number stories. Explain that you will be exploring them together throughout this lesson. Question 1 a) focuses attention on one part of the picture (people walking dogs) and elicits a number story from children. Question 1 b) focuses on a different part and a different story (the seesaw).

PRACTICAL TIPS Use concrete objects in the classroom to represent the scenario.

ANSWERS

Question 1 a): There are 8 dogs altogether.

Question 1 b): There is 1 person on one side of the seesaw, and 3 people on the other side:
 $1 + 3 = 4$.



Share

WAYS OF WORKING Whole class teacher led

ASK

- Question 1 a): What does the number 4 show in this calculation?
- Question 1 b): What different thing does the number 4 show in this calculation?
- Question 1 b): If you added 1 dog and 3 dogs, would that be the same as adding 1 ball and 3 balls?

IN FOCUS Before question 1 a), two different characters suggest different methods for solving the calculation. Look at what Astrid says. Ask: Do you agree or disagree with Astrid? Counting using counters would give us the right answer, but it would also take a long time.

STRENGTHEN Strengthen children's understanding by discussing that the 4 in question 1 a) represents the number of dogs one person has (a part). The 4 in question 1 b) represents the number of people altogether (the whole). Ask: Can you spot any other places in the picture where one number has different meanings?

Addition problems

Discover



- 1 a) Dale has 4 dogs and Liz has 4 dogs.
How many dogs are there altogether?
- b) What part of the picture shows $1 + 3$?
Show this using a part-whole model.

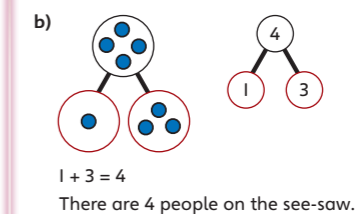
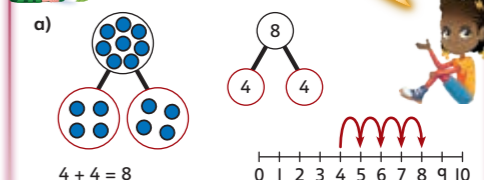
108

PUPIL TEXTBOOK 1A PAGE 108

Share



I used a part-whole model and tried a number line too.



109

PUPIL TEXTBOOK 1A PAGE 109

Think together

WAYS OF WORKING Whole class teacher led (I do, We do, You do)

- ASK**
- Question 1: How many jam tarts can you see? How many jam tarts are hidden?
 - Question 2: You can see the whole picture and all of the parts of the story. How many children have short hair? How many children have long hair?

IN FOCUS In question 1, there are 3 jam tarts shown and 6 hidden in the box. Children may be tempted to start counting on from 3 on the number line, as that is the number they can see. In question 2, children develop first their confidence in knowing the parts and how they can use different methods to find the whole. For example, some children may just count all the children on the roundabout, others may count on. Children realise that an addition can be written down either way as the answer is the same. So $2 + 3$ gives the same answer as $3 + 2$. Children could use concrete materials to show that this is the case.

STRENGTHEN Strengthen children's understanding by asking them to work in pairs to complete question 3, which prompts them to look again at the picture from the **Discover** section. Ask children to tell their partners another number story they can see. Their partner should articulate which number relates to which part of the story.

DEEPEN Deepen children's understanding of question 1 by asking them to switch the numbers around. In the question, there are 6 tarts in the box and 3 tarts on the plate.

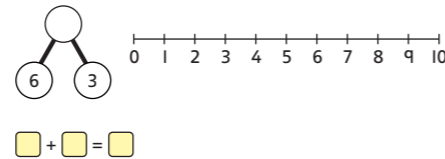
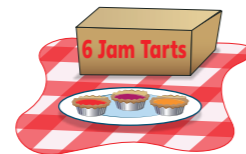
ASSESSMENT CHECKPOINT Assess how far children understand that calculations have meanings based on the contexts of the problems. Check that they grasp that changing contexts does not impact the answer.

ANSWERS

- Question 1: $6 + 3 = 9$
There are 9 jam tarts altogether.
- Question 2: $2 + 3 = 5$
 $3 + 2 = 5$
- Question 3: For example:
There are 2 adults and 4 children at the picnic.
 $2 + 4 = 6$.
There are 6 people at the picnic altogether.

Think together

- 1 There are 6 jam tarts in the box.
There are 3 jam tarts on the plate.
How many jam tarts are there altogether?



110

PUPIL TEXTBOOK 1A PAGE 110

- 2 Look at the children on the roundabout.



There are 2 children with long hair.
There are 3 children with short hair.
There are 5 children altogether.
Find two ways to show this fact.

$\square + \square = \square$ $\square + \square = \square$

- 3 Look at the park in Discover.
What other number stories can you see?
Ask a partner.
How many number stories can you find?

I will try to find a number story that no one else has seen.



Practice book 1A p77

PUPIL TEXTBOOK 1A PAGE 111

Practice

WAYS OF WORKING Independent thinking

IN FOCUS Children interpret each image to create number sentences. In questions 1 and 2, children could count to find the total. Questions 3 onwards removes this scaffold.

STRENGTHEN If needed for questions 3 onwards, children could use counters or cubes to represent the numbers, giving them the option to count to find the total. If children do this, encourage them to start counting from the greater number rather than from 1.

DEEPEN In question 5, challenge children to draw a picture where it is possible to count and a picture where it is not possible to count.

ASSESSMENT CHECKPOINT Check that children are counting on to find the totals. Identify children who need to use concrete materials to access the questions.

ANSWERS Answers for the **Practice** part of the lesson can be found in the *Power Maths* online subscription.

Reflect

WAYS OF WORKING Group work

IN FOCUS Children work backwards to tell a story for $4 + 1$. They may use a 'first, then, now' story to do this.

ASSESSMENT CHECKPOINT Listen for children's language in explaining their story. What do they say? Do they use the words and phrases 'plus', 'is equal to', 'altogether' and 'in total'?

ANSWERS Answers for the **Reflect** part of the lesson can be found in the *Power Maths* online subscription.

After the lesson

- Are children fluent enough with their number bonds to 10 that they are using them in a variety of contexts, including contexts they have made up?
- Have any children shown an awareness of counting back, as well as counting on, when using the number line? This will be explored further in the next unit.

Date: _____ Unit 3: Add together, Lesson 3

Addition problems

1 How many altogether?

a) $8 + 2 = \square$

b) $4 + 3 = \square$

c) $1 + 5 = \square$

2 What are the total scores?

a) $\square + \square = \square$

b) $\square + \square = \square$

79

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Unit 3: Add together, Lesson 3

3 Look at the darts. What are the total scores?

a) $\square + \square = \square$

b) $\square + \square = \square$

c) $\square + \square = \square$

d) $\square + \square = \square$

4 How many altogether?

$\square + \square = \square$

80

PUPIL PRACTICE BOOK 1A PAGE 80

Unit 3: Add together, Lesson 3

5 Draw a story picture for $5 + 5$.

Reflect
Tell a partner a story for $4 + 1$.

81

PUPIL PRACTICE BOOK 1A PAGE 81

Addition problems

Discover



Dale

Liz

- I** a) Dale has 4 dogs and Liz has 4 dogs.
How many dogs are there altogether?
- b) What part of the picture shows $1 + 3$?
Show this using a part-whole model.

Share

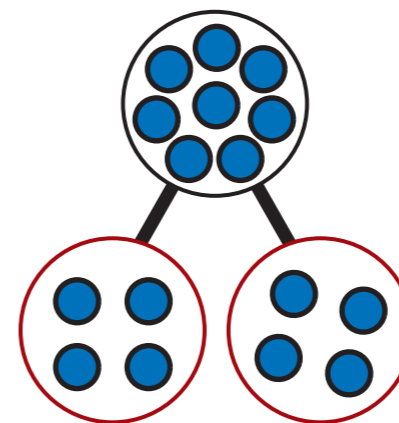


I used
counters.

I used a part-whole
model and tried a
number line too.

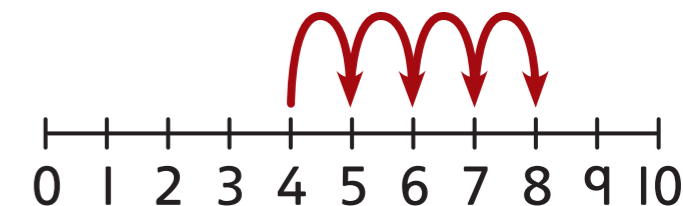
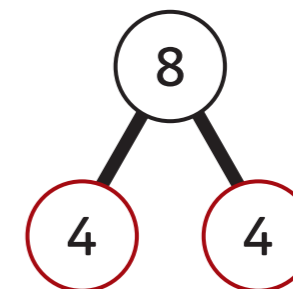


a)

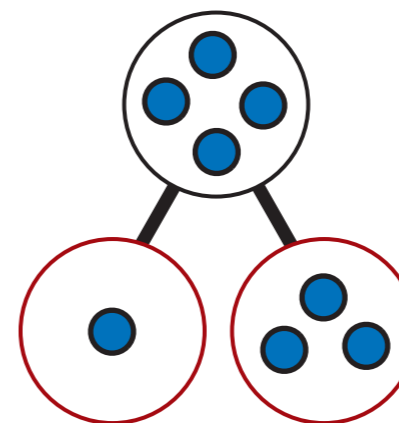


$$4 + 4 = 8$$

There are 8 dogs altogether.

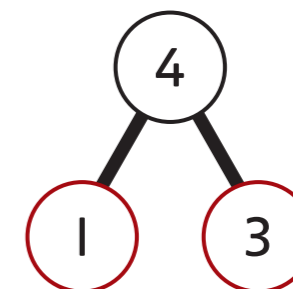


b)



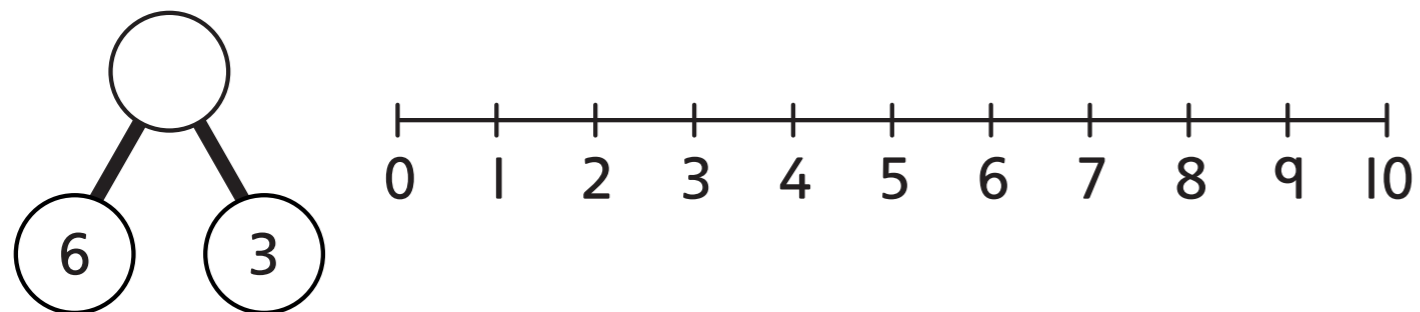
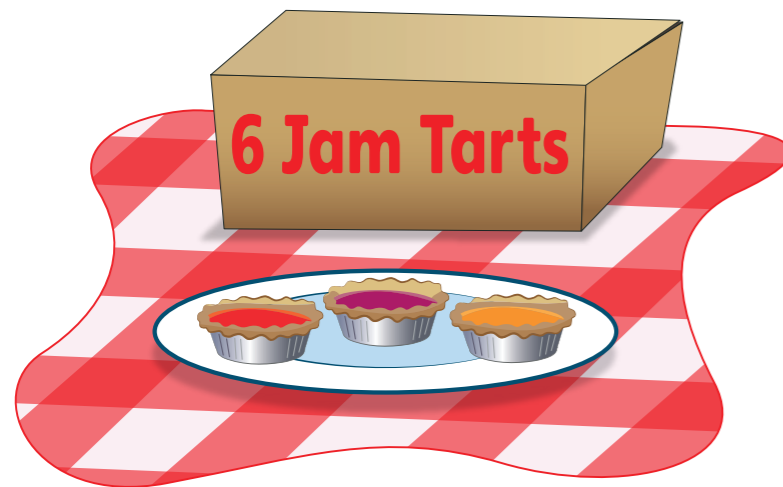
$$1 + 3 = 4$$

There are 4 people on the see-saw.



Think together

- 1 There are 6 jam tarts in the box.
There are 3 jam tarts on the plate.
How many jam tarts are there altogether?



$$\square + \square = \square$$

- 2 Look at the children on the roundabout.



There are 2 children with long hair.
There are 3 children with short hair.
There are 5 children altogether.
Find two ways to show this fact.

$$\square + \square = \square$$

$$\square + \square = \square$$

- 3 Look at the park in Discover.
What other **number stories** can you see?
Ask a partner.
How many number stories can you find?

CHALLENGE

I will try to find a number story that no one else has seen.



Addition problems


1 How many altogether?


a)  $8 + 2 = \square$

b)  $4 + 3 = \square$

c)  $1 + 5 = \square$

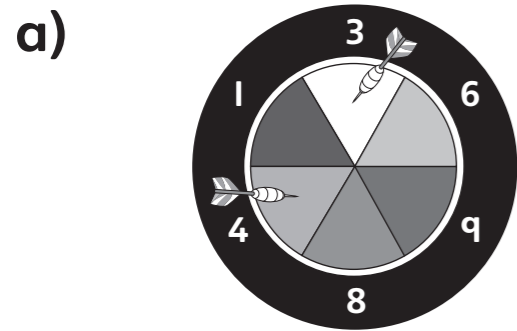
2 What are the total scores?

a)  $\square + \square = \square$

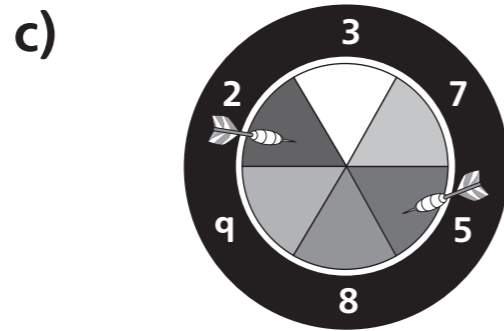
b)  $\square + \square = \square$



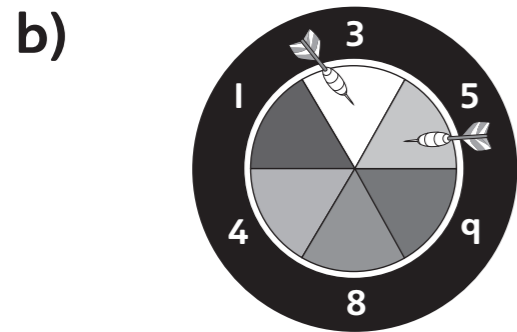
3 Look at the darts. What are the total scores?



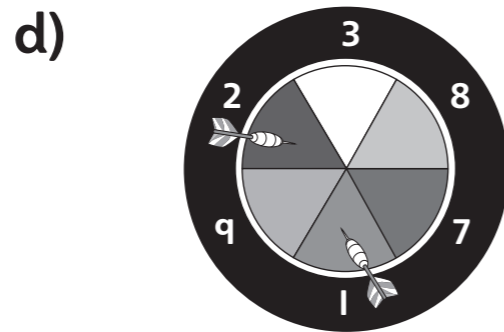
$$\square + \square = \square$$



$$\square + \square = \square$$

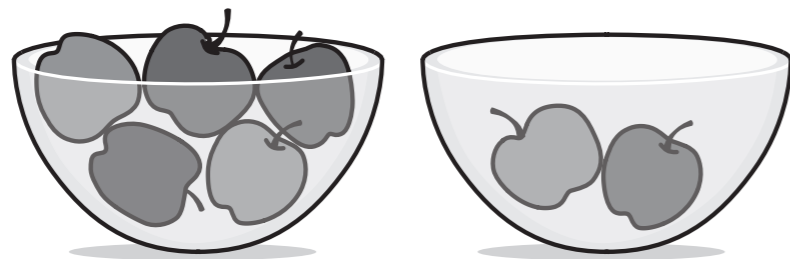


$$\square + \square = \square$$



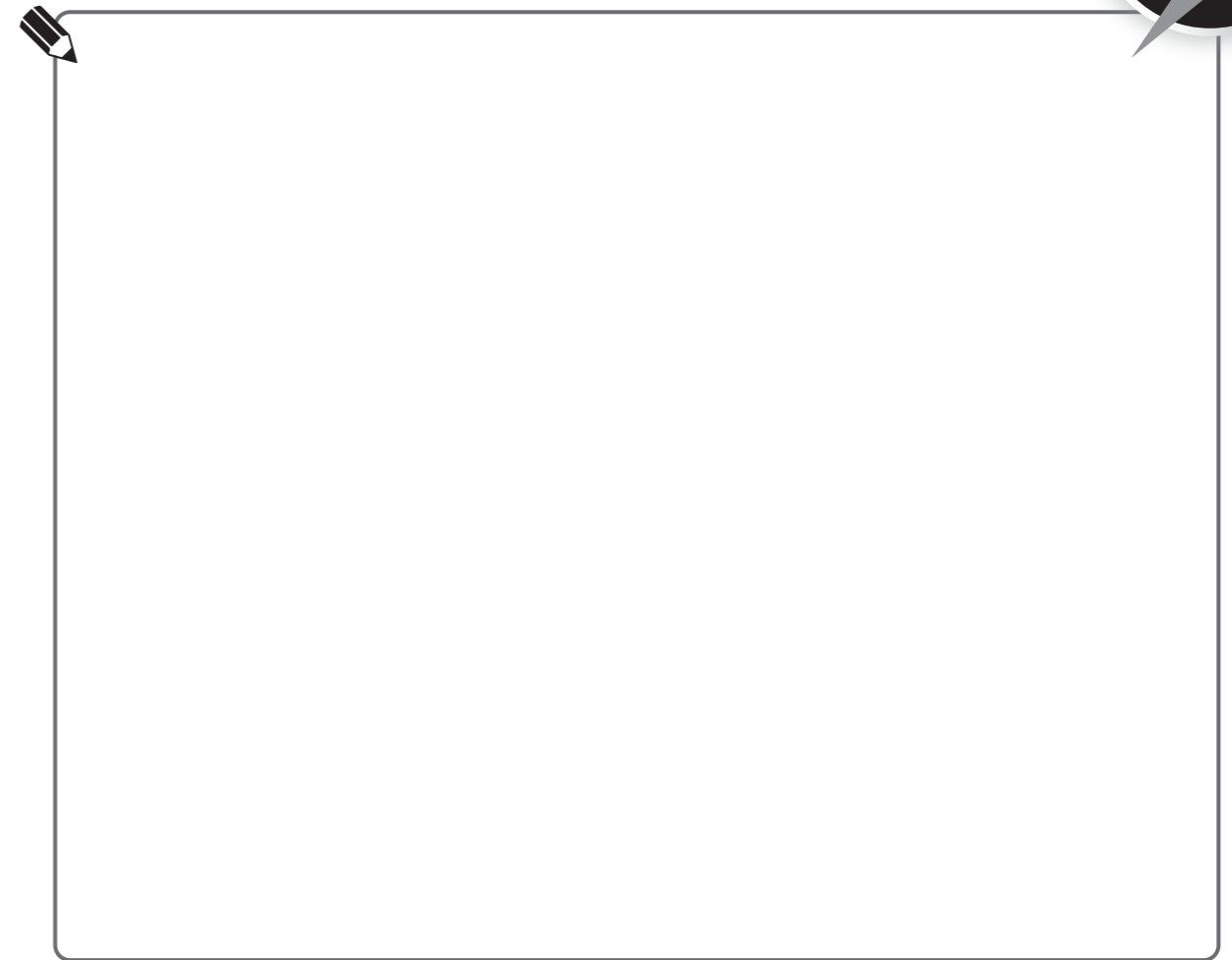
$$\square + \square = \square$$

4 How many altogether?



$$\square + \square = \square$$

5 Draw a story picture for $5 + 5$.



Reflect

Tell a partner a story for $4 + 1$.

Year 2

Unit 2: Addition and subtraction (1)



Add and subtract two multiples of 10

Learning focus

In this lesson, children use known facts with 1s to determine other facts with corresponding multiples of 10.

Before you teach

- Can children think of number facts that they could use independently?
- How will you encourage children to make links with known facts?

NATIONAL CURRICULUM LINKS

Number – addition and subtraction

Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100.

ASSESSING MASTERY

Children can use number bonds within 10 to determine related facts with multiples of 10, rather than calculating these facts as a result of using addition or subtraction in an inefficient way. Children can identify why each helps with the related calculation.

COMMON MISCONCEPTIONS

Children may not see the purpose of using known facts and may find alternative ways to calculate the answer. Ask:

- *What fact did you use to help with this calculation?*

STRENGTHENING UNDERSTANDING

Ask children to make the numbers using concrete manipulatives alongside the abstract calculations. They should explain the parts that they have made and describe how the known fact relates to the unknown fact (for example, 2 ones + 3 ones = 5 ones so 2 tens + 3 tens = 5 tens).

GOING DEEPER

Encourage children to describe more than one fact that they could use to help them find the solution to a new problem. This will highlight their flexibility and fluency of number facts.

KEY LANGUAGE

In lesson: facts, number sentence, signs, digits, ones (1s), tens (10s)

Other language to be used by the teacher: number bonds, addition, subtraction, link, relate


STRUCTURES AND REPRESENTATIONS

Part-whole model, bar model

RESOURCES

Mandatory: base 10 equipment

Optional: blank number sentence scaffold

 In the eTextbook of this lesson, you will find interactive links to a selection of teaching tools.

Quick recap

Ask children to count on to 100 in 10s. Then ask them to count down from 100 in 10s. Look together for all the 10s on a 100 square.

Discover

WAYS OF WORKING Pair work

ASK

- *What do you know about 2 + 3?*
- *What other facts can you work out from this?*

IN FOCUS The numbers in question 1 allow children to make simple links between the number of pencils Milo and Mr Abbot each have.

PRACTICAL TIPS Encourage children to make links by asking them to draw both sets of pencils or make both sets of numbers with resources.

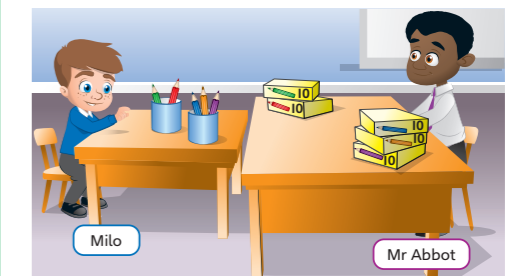
ANSWERS

Question 1 a): Milo has 5 pencils.

Question 1 b): Mr Abbot has 50 pencils.

Add and subtract two multiples of 10

Discover



- 1 a) How many pencils does Milo have?
b) How many pencils does Mr Abbot have?

88

PUPIL TEXTBOOK 2A PAGE 88

Share

WAYS OF WORKING Whole class teacher led

ASK

- Question 1 b): *What is the same and what is different about the number of pencils Milo and Mr Abbot each have?*
- Question 1 b): *How many parts do Milo and Mr Abbot each have?*

IN FOCUS When tackling question 1 b), children should be able to make links between the number of pencils that Milo and Mr Abbot have: they should be able to see that the number of 1s that Milo has is the same as the number of 10s that Mr Abbot has.

Share

a)

2 ones + 3 ones = 5 ones
2 + 3 = 5
Milo has 5 pencils.

I wrote 5 = 2 + 3.

b)

2 tens + 3 tens = 5 tens
20 + 30 = 50
Mr Abbot has 50 pencils.

89

PUPIL TEXTBOOK 2A PAGE 89

Think together

WAYS OF WORKING Whole class teacher led (I do, We do, You do)

ASK

- Question 1: How does $4 + 3 = 7$ help you to know that $40 + 30 = 70$?
- Question 2: How does the part-whole model help you with the second calculation?
- Question 3: Whose strategy is more efficient, Astrid's or Flo's?

IN FOCUS Question 1 is similar to the **Discover** question, while question 2 removes the pictorial representations and includes only the model. Encourage children to verbalise how the known fact helps them with the unknown fact. Question 3 builds on work from the previous lesson as well as requiring children to use a known fact to help with the calculations.

STRENGTHEN Making the known and unknown facts using base 10 equipment will strengthen children's understanding of how the facts are linked. Encourage them to explain the facts (for example, 5 ones + 1 one = 6 ones, so 5 tens + 1 ten = 6 tens).

DEEPEN Give children a part-whole model for 50, 20 and 30. Ask them to write the fact family that matches the part-whole model. Can they find all the additions and subtractions?

ASSESSMENT CHECKPOINT Children should be able to explain the links between the calculations in questions 1 to 3. Use their explanations to assess whether children are using known facts or if they are simply calculating each answer.

ANSWERS

- Question 1 a): $4 + 3 = 7$
 There are **7** pencils.
 $4 + 3 = 7$
 There are **7** apples.
 $4 \text{ ones} + 3 \text{ ones} = 7 \text{ ones}$
 $4 \text{ tens} + 3 \text{ tens} = 7 \text{ tens}$
- Question 1 b): $4 + 3 = 7$
 $40 + 30 = 70$
- Question 2: $2 + 6 = 8$
 $20 + 60 = 80$
- Question 3: $50 + 10 = 60$
 $10 + 50 = 60$
 $60 - 50 = 10$
 $10 = 60 - 50$

Think together

1 a) Complete the following.

$4 \text{ ones} + 3 \text{ ones} = \square \text{ ones}$
 $4 \text{ tens} + 3 \text{ tens} = \square \text{ tens}$

b) Complete the following.

$4 + 3 = \square$
 $40 + 30 = \square$

2 Use the part-whole model to complete the number sentences.

$2 + 6 = \square$
 $20 + 60 = \square$

90

PUPIL TEXTBOOK 2A PAGE 90

3 Here is a number bond.

$5 + 1 = 6$

Complete the number sentences.

- $50 + 10 = \square$
 $10 + \square = 60$
 $60 - 50 = \square$
 $10 = \square - 50$

I will use the number sentence $5 + 1 = 6$ to get the answers.

I will use base 10 equipment to help.



Practice book 2A p65 91

PUPIL TEXTBOOK 2A PAGE 91

Practice

WAYS OF WORKING Independent thinking

IN FOCUS All the **Practice** questions require children to make links to known facts in order to calculate unknown facts. In question 1 the known and unknown facts are displayed alongside each other, but this support is gradually withdrawn throughout the later questions, to test children's understanding further.

STRENGTHEN If children are finding the concept difficult, they should continue to use concrete resources alongside the abstract calculations they are required to complete. Encourage them to describe the parts and the wholes they are making and to explain what is the same and what is different about the known and unknown facts.

DEEPEN Question 4 challenges children to make links between number bonds to 10 and how to add and subtract two multiples of 10. They should use the part-whole models in part a) to complete the number sentences in part b).

ASSESSMENT CHECKPOINT Assess whether children can justify how the known fact helps them calculate the unknowns. Ask them to explain the link in full sentences.

ANSWERS Answers for the **Practice** part of the lesson can be found in the *Power Maths* online subscription.

Reflect

WAYS OF WORKING Independent thinking

IN FOCUS The **Reflect** part of the lesson allows children to show what they have learnt in this and previous lessons. Encourage them to include number facts involving 10s numbers. This will show whether they fully understand how to derive facts about multiples of 10 from calculations with 1s.

ASSESSMENT CHECKPOINT Assess whether children can explain how they know their number facts are correct, based on the number fact they have been given.

ANSWERS Answers for the **Reflect** part of the lesson can be found in the *Power Maths* online subscription.

After the lesson

- What were the most common misconceptions that arose during the lesson?
- How will you address these misconceptions before the next lesson?

Date: _____ Unit 2: Addition and subtraction (1), Lesson 3

Add and subtract two multiples of 10

1 Complete the part-whole models and number sentences.

a) $2 + \square = 9$ $\square = 9 - 2$
 $20 + \square = 90$ $\square = 90 - 20$

b) $20 + \square = 90$ $\square = 90 - 20$

2 Find the missing numbers.

a) $2 + \square = 9$
 $\square = 9 - 2$

b) $1 + \square = 8$
 $\square = 8 - 1$

PUPIL PRACTICE BOOK 2A PAGE 65

Unit 2: Addition and subtraction (1), Lesson 3

3 Use the diagrams to complete the number sentences.

a) $3 + 6 = \square$
 $30 + 60 = \square$
 $9 - 3 = \square$
 $90 - 30 = \square$

b) $\square = 4 + 5$
 $50 + 40 = \square$
 $90 - 50 = \square$

c) $40 + 10 = \square$
 $50 - 40 = \square$
 $50 - \square = 40$

PUPIL PRACTICE BOOK 2A PAGE 66

Unit 2: Addition and subtraction (1), Lesson 3

4 a) Complete the part-whole models.

b) Complete the following.

$20 + \square = 60$ $60 - \square = 10$
 $30 + \square = 60$ double $\square = 60$
 $\square + 50 = 60$

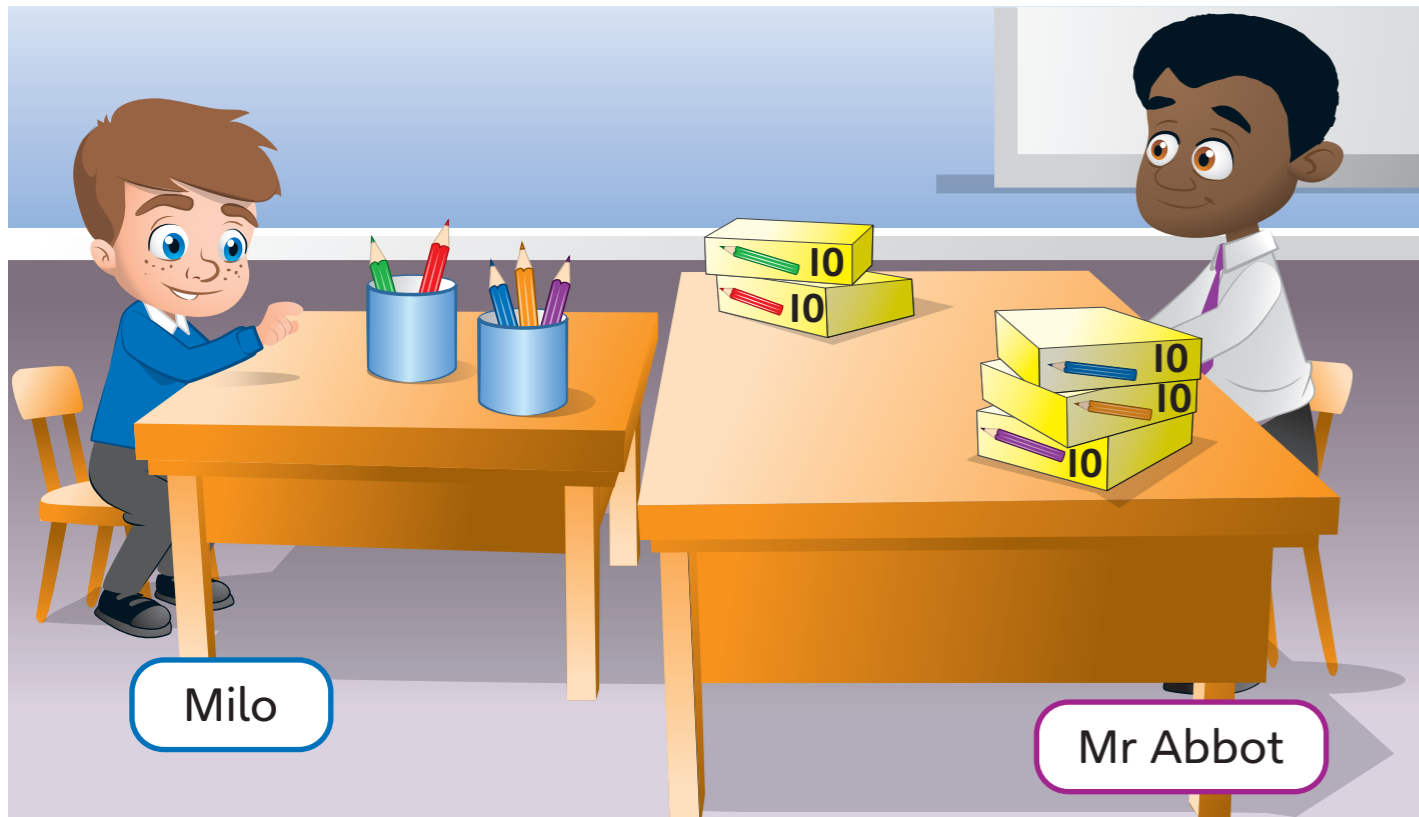
Reflect

Write down some number facts related to $3 + 5 = 8$.

PUPIL PRACTICE BOOK 2A PAGE 67

Add and subtract two multiples of 10

Discover



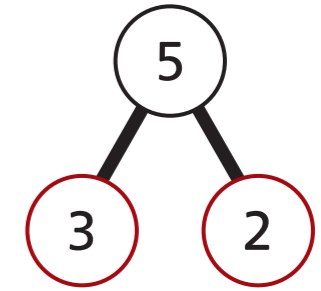
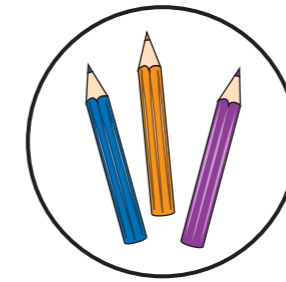
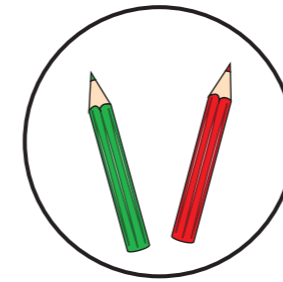
Milo

Mr Abbot

- How many pencils does Milo have?
- How many pencils does Mr Abbot have?

Share

a)



+



=



2 ones

+

3 ones

=

5 ones

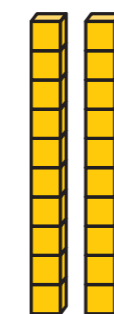
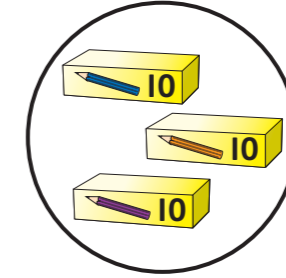
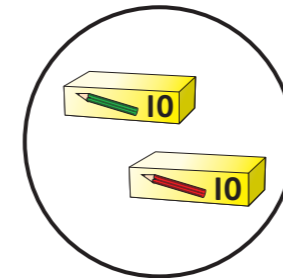
$$2 + 3 = 5$$

Milo has 5 pencils.

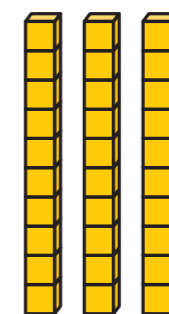
I wrote
 $5 = 2 + 3$.



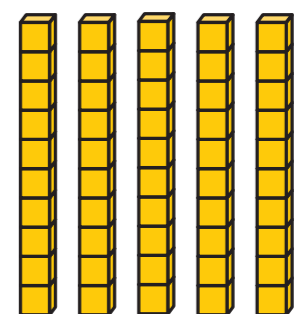
b)



+



=



2 tens

+

3 tens

=

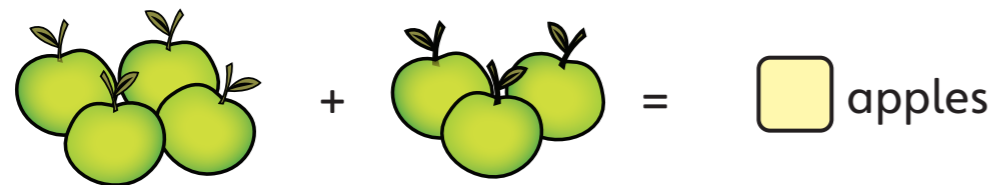
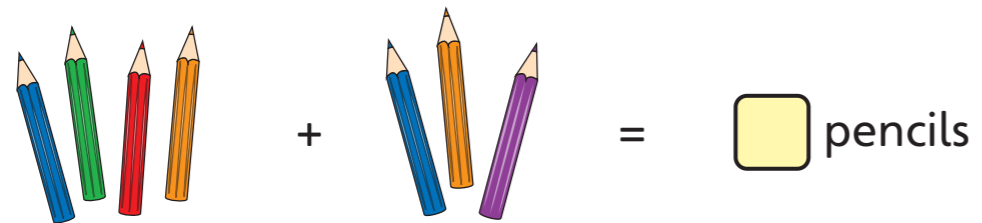
5 tens

$$20 + 30 = 50$$

Mr Abbot has 50 pencils.

Think together

1 a) Complete the following.



$4 \text{ ones} + 3 \text{ ones} = \square \text{ ones}$

$4 \text{ tens} + 3 \text{ tens} = \square \text{ tens}$

b) Complete the following.

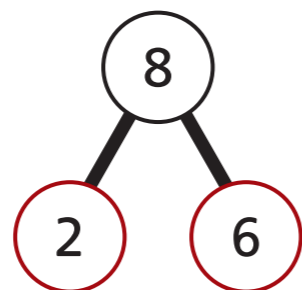
$4 + 3 = \square$

$40 + 30 = \square$

2 Use the part-whole model to complete the number sentences.

$2 + 6 = \square$

$20 + 60 = \square$



3 Here is a number bond.

$$5 + 1 = 6$$

Complete the number sentences.

$50 + 10 = \square$

$10 + \square = 60$

$60 - 50 = \square$

$10 = \square - 50$

I will use the number sentence $5 + 1 = 6$ to get the answers.



I will use base 10 equipment to help.

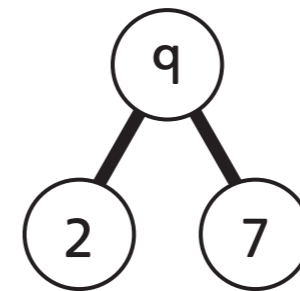
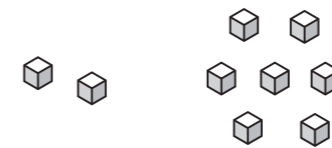


CHALLENGE

Add and subtract two multiples of 10

1 Complete the part-whole models and number sentences.

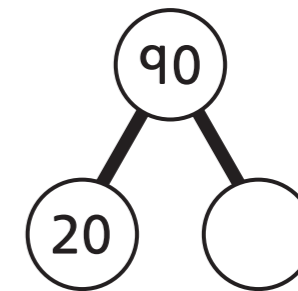
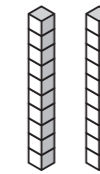
a)



$$2 + \square = 9$$

$$\square = 9 - 2$$

b)

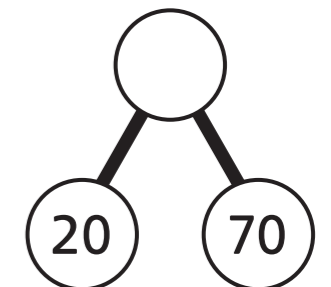
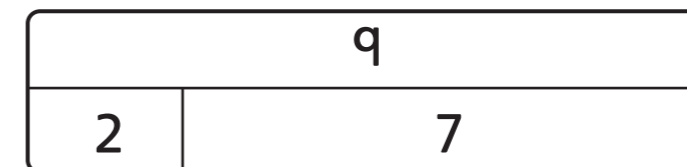


$$20 + \square = 90$$

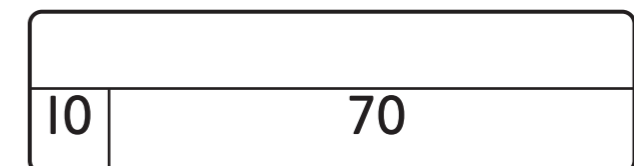
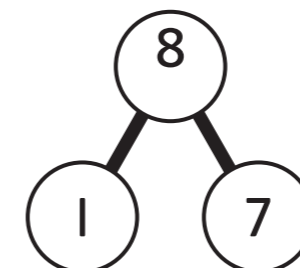
$$\square = 90 - 20$$

2 Find the missing numbers.

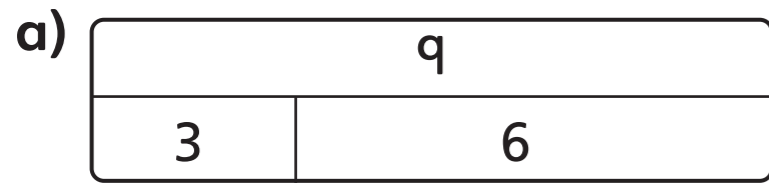
a)



b)



3 Use the diagrams to complete the number sentences.

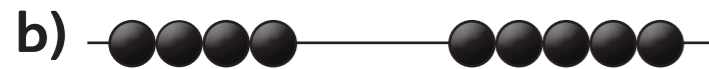


$3 + 6 = \square$

$30 + 60 = \square$

$q - 3 = \square$

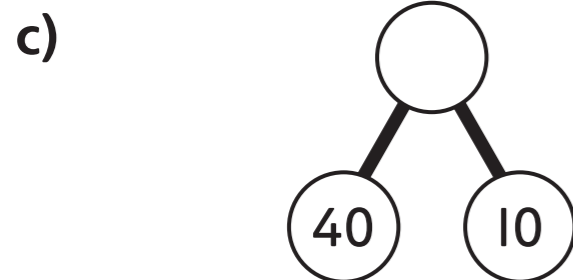
$90 - 30 = \square$



$\square = 4 + 5$

$50 + 40 = \square$

$90 - 50 = \square$



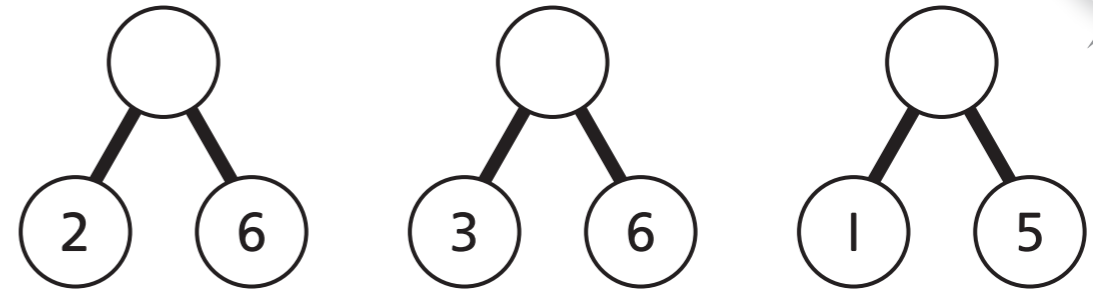
$40 + 10 = \square$

$50 - 40 = \square$

$50 - \square = 40$



4 a) Complete the part-whole models.



b) Complete the following.

$20 + \square = 60$

$60 - \square = 10$

$30 + \square = 60$

double $\square = 60$

$\square + 50 = 60$

Reflect

Write down some number facts related to $3 + 5 = 8$.

- _____
- _____
- _____
- _____
- _____



Year 3

Unit 2: Addition and subtraction (1)



Add 10s across 100

Learning focus

In this lesson, children will develop their understanding of adding 10s to a 3-digit number, including examples which require exchange of 10 tens for 1 hundred.

Before you teach II

- Can children answer questions such as: *What number is 17 tens?*
- Can children count in 10s, for example, from 65 up to 165?

NATIONAL CURRICULUM LINKS

Number – addition and subtraction

Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction.

Add and subtract numbers mentally, including: a 3-digit number and 1s, a 3-digit number and 10s, a 3-digit number and 100s.

ASSESSING MASTERY

Children can add multiples of 10 and recognise when they need to exchange 10 tens for 1 hundred.

COMMON MISCONCEPTIONS

Children may struggle with the flexible partitioning of the 10s required to cross the 100. Ask:

- *How many different ways can you partition 80 using 10s?*

Crossing the 100s can cause children to struggle with exchange. They may often forget to include the exchanged digit or, for example, misconstrue 13 tens as 103. Ask:

- *What number is 13 tens?*

STRENGTHENING UNDERSTANDING

Children should explore the concept of exchange using place value equipment. It may also help to represent the additions on a number line, and justify why the addition crosses into the next 100.

GOING DEEPER

Now that children will be able to add a multiple of 10 to any 3-digit number, challenge children to explore such conjectures as: *When you add 90 to a number, you always need to exchange 10 tens; When you add 50, you sometimes do not need to exchange.*

KEY LANGUAGE

In lesson: addition, tens (10s), number line, exchange, calculations, 3-digit number

Other language to be used by the teacher: hundreds (100s), ones (1s)


STRUCTURES AND REPRESENTATIONS

Number lines, place value grids

RESOURCES

Mandatory: base 10 equipment, place value counters

Optional: 0–9 digit cards

 In the eTextbook of this lesson, you will find interactive links to a selection of teaching tools.

Quick recap

Play a game of bingo using bonds within 20. Children pick ten numbers from 3 to 20. Say simple addition facts within 20. If they have got it on their grid, then they cross it off. The winner is the first person to cross off five numbers.

Discover

WAYS OF WORKING Pair work

ASK

- Questions 1 a) and b): *What is the same and what is different about the calculations? Which calculation requires more steps of thinking? How could you represent the additions?*

IN FOCUS The important point is for children to notice that they can employ the method of adding 10s in question 1 a) but also recognise that they will need to adapt their thinking for the calculation in question 1 b).

PRACTICAL TIPS Represent the age of the beech tree using place value equipment. Locate its age on a number line. Then represent the numbers to be added using equipment and jumps on a number line.

ANSWERS

Question 1 a): $184 + 10 = 194$.
The birch tree is 194 years old.

Question 1 b): $184 + 20 = 204$.
The horse chestnut tree is 204 years old.

Add 10s across 100

Discover



1 a) The birch tree is 10 years older than the beech tree.
How old is the birch tree?

b) The horse chestnut tree is 20 years older than the beech tree.
How old is the horse chestnut tree?

88

PUPIL TEXTBOOK 3A PAGE 88

Share

WAYS OF WORKING Whole class teacher led

ASK

- Question 1 b): *How do you know that the age of the horse chestnut tree will be greater than 200? Are you exchanging 10 ones or 10 tens?*
- Question 1 b): *Could you represent the calculation as $184 + 10 + 10$? What would this look like?*

IN FOCUS The idea of exchange is key to this lesson. Here we see that one of the calculations crosses into the next 100, and children should discuss and explore how this is represented by the place value grids. Although children should gain developmental fluency, the concept of exchange will support later development of more formal written methods. Children should see that this is similar to the previous lessons where they were adding ones across 10. The main focus of this lesson is using base 10 and counters to show the exchange, however you may want to back this up with a number line.

Share

a) $8 \text{ tens} + 1 \text{ ten} = 9 \text{ tens}$

H	T	O
1	8	4

$184 + 10 = ?$
I can add the 10s.

$184 + 10 = 194$

The birch tree is 194 years old.

b)

H	T	O
1	8	4

$184 + 20 = ?$
I added the 10s.
 $8 \text{ tens} + 2 \text{ tens} = 10 \text{ tens}$
There are 10 tens. I know that is not 1,104.

H	T	O
2	0	4

$184 + 20 = 204$

The horse chestnut tree is 204 years old.

Exchange 10 tens for 1 hundred.

89

PUPIL TEXTBOOK 3A PAGE 89

Think together

WAYS OF WORKING Whole class teacher led (I do, We do, You do)

ASK

- Questions 1: Which row represents the age of the beech tree? How do you know? Which columns are going to change? How do you know?
- Questions 2: Which columns are going to change? How do you know? Will you need to make an exchange? How do you know?

IN FOCUS The focus here is for children to make connections between the total number of 10s and how you can use this to decide whether an exchange will be necessary. They should be able to count in 10s beyond a 100 to help them find the answers. To help children understand the concept even more deeply you may want to explore this on a number line.

STRENGTHEN Provide children with base 10 equipment and a place value grid to support them in finding the answers. They could also draw jumps of 10 on a number line to support their counting.

DEEPEN In question 3, encourage children to explain how they know the answer for each question and to make the decisions without performing the calculations. Can they summarise which digits always/sometimes/never change?

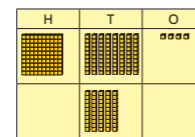
ASSESSMENT CHECKPOINT Use questions 1 and 2 to check that children can add multiples of 10 to a 3-digit number where the calculation requires an exchange.

ANSWERS

- Question 1: $184 + 50 = 234$
The oak tree is 234 years old.
- Question 2: $263 + 70 = 333$
- Question 3 a): $458 + 20 = 478$
- Question 3 b): $458 + 30 = 488$
- Question 3 c): $458 + 60 = 518$
- Question 3 d): $458 + 80 = 538$

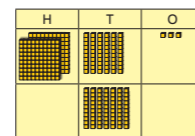
Think together

- 1 The oak tree is 50 years older than the beech tree. How old is the oak tree?



$184 + 50 = \square$

- 2 Work out $263 + 70$.

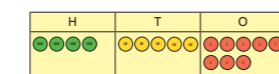


$263 + 70 = \square$

I'm going to try and work this out in my head.



- 3 Mia has made the number 458.



For which of the following calculations will Mia need to do an exchange?

- a) $458 + 20$ c) $458 + 60$
- b) $458 + 30$ d) $458 + 80$

I can tell if it's possible to do an exchange just by looking and thinking about the calculation.



I wonder if the 1s digit will ever change.



Practice

WAYS OF WORKING Independent thinking

IN FOCUS The focus of this section is for children to consolidate their learning on adding multiples of 10, crossing the 100. In question 1, they perform these calculations where the base 10 equipment is represented for them. In question 2, they work more abstractly and are encouraged to spot connections between questions and answers.

STRENGTHEN Provide children with a place value grid and base 10 equipment to represent the questions and support them in finding the answers.

DEEPEN In question 6, encourage children to explain why Danny has chosen this method. Give them similar questions and ask them to adapt Danny's method to solve them. How many different ways can they find to answer Danny's question? Is one method always the most efficient?

THINK DIFFERENTLY In question 4, children are exposed to a common misconception in adding 10s and encouraged to explain the mistake that has been made.

ASSESSMENT CHECKPOINT Use questions 1 and 2 to assess whether children can add 10s to a 3-digit number where the calculation requires an exchange. Use question 3 to assess whether children can identify missing numbers in questions. Use question 4 to check that children can identify the mistake that has been made and why it is incorrect.

ANSWERS Answers for the Practice part of the lesson can be found in the Power Maths online subscription.

Reflect

WAYS OF WORKING Independent thinking

IN FOCUS The sentence stem prompts children to really think about the relationship between the additions and the concept of place value. Encourage children to show examples of when exchange is necessary and when it is not necessary.

ASSESSMENT CHECKPOINT This section will show if children engage decision making processes, rather than simply performing rote calculations.

ANSWERS Answers for the Reflect part of the lesson can be found in the Power Maths online subscription.

After the lesson II

- Can children decide when exchange is necessary?
- Can children justify their answers to themselves and to others by invoking number bonds?
- Can children choose a representation to illustrate their mental methods?

Unit 2: Addition and subtraction (1), Lesson 7 Date: _____

Add 10s across 100

1 Work out the additions.

a) $275 + 60 = \square$

H	T	O
2	7	5
	6	

b) $494 + 60 = \square$

H	T	O
4	9	4
	6	

c) $568 + 60 = \square$

H	T	O
5	6	8
	6	

66

PUPIL PRACTICE BOOK 3A PAGE 66

Unit 2: Addition and subtraction (1), Lesson 7

2 Make the number 382 from place value counters.

H	T	O
3	8	2

Add these numbers to 382.

a) Add 10 d) Add 40

b) Add 20 e) Add 80

c) Add 30

3 Work out

a) $454 + 70 = \square$

$474 + 50 = \square$

b) $593 + 60 = \square$

$563 + 90 = \square$

I notice something about my answers. I wonder why this is.

4 What mistake has Isla made?

$80 + 538$
8 tens + 3 tens = 11 tens
 $80 + 538 = 518$

67

PUPIL PRACTICE BOOK 3A PAGE 67

Unit 2: Addition and subtraction (1), Lesson 7

5 Complete the missing numbers.

a) $234 + 90 = \square$ d) $20 + \square = 319$

b) $371 + 50 = \square$ e) 50 more than 762 is

c) $\square = 40 + 569$ f) $150 = \square + 90$

6 Danny is working out $861 + 90$ in his head.

I will first add on 40.

I will then add on 50.

a) Work out $861 + 90$ using Danny's method.

b) Tell a partner a different way to work out $861 + 90$.

Reflect

When I add a 3-digit number and 10s, I know I will need to exchange 10 tens for 1 hundred if ...

68

PUPIL PRACTICE BOOK 3A PAGE 68

Add 10s across 100

Discover



Beech:
184 years old

Birch

Horse chestnut

Oak

- I** a) The birch tree is 10 years older than the beech tree.
How old is the birch tree?
- b) The horse chestnut tree is 20 years older than the beech tree.
How old is the horse chestnut tree?

Share

a) $8 \text{ tens} + 1 \text{ ten} = 9 \text{ tens}$

H	T	O

$184 + 10 = 194$

The birch tree is 194 years old.

b)

H	T	O

H	T	O

$184 + 20 = 204$

The horse chestnut tree is 204 years old.

$184 + 10 = ?$
I can add the 10s.



$184 + 20 = ?$
I added the 10s.
 $8 \text{ tens} + 2 \text{ tens} = 10 \text{ tens}$
There are 10 tens. I know that is not 1,104.



Exchange
10 tens for
1 hundred.



Think together

- 1 The oak tree is 50 years older than the beech tree.
How old is the oak tree?

H	T	O

$184 + 50 = \square$

- 2 Work out $263 + 70$.

H	T	O

$263 + 70 = \square$

I'm going to try and work this out in my head.



- 3 Mia has made the number 458.

H	T	O

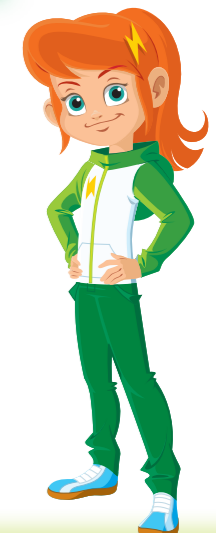
For which of the following calculations will Mia need to do an exchange?

- a) $458 + 20$ c) $458 + 60$
 b) $458 + 30$ d) $458 + 80$



I can tell if it's possible to do an exchange just by looking and thinking about the calculation.

I wonder if the 1s digit will ever change.



Add 10s across 100

→ Textbook 3A p88

1 Work out the additions.

a) $275 + 60 = \square$

H	T	O

b) $494 + 60 = \square$

H	T	O

c) $568 + 60 = \square$

H	T	O

2 Make the number 382 from place value counters.

H	T	O

Add these numbers to 382.

a) Add 10

d) Add 40

b) Add 20

e) Add 80

c) Add 30

3 Work out

a) $454 + 70 = \square$

$474 + 50 = \square$

b) $593 + 60 = \square$

$563 + 90 = \square$

I notice something about my answers. I wonder why this is.



4 What mistake has Isla made?



$80 + 538$
 $8 \text{ tens} + 3 \text{ tens} = 11 \text{ tens}$
 $80 + 538 = 518$



5 Complete the missing numbers.

a) $234 + 90 = \square$

b) $371 + 50 = \square$

c) $\square = 40 + 569$

d) $20 + \square = 319$

e) 50 more than 762 is \square

f) $150 = \square + 90$

6 Danny is working out $861 + 90$ in his head.

I will first add on 40.



I will then add on 50.

CHALLENGE

a) Work out $861 + 90$ using Danny's method. \square

b) Tell a partner a different way to work out $861 + 90$.

Reflect

When I add a 3-digit number and 10s, I know I will need to exchange 10 tens for 1 hundred if ... _____

Year 4

Unit 3: Addition and subtraction



Add and subtract 1s, 10s, 100s, 1,000s

Learning focus

In this lesson, children will use their knowledge of place value to add and subtract 1, 10, 100 and 1,000 to and from 4-digit numbers.

Before you teach II

- Would base 10 equipment help some children with their understanding of place value in this lesson?
- Which children do you think will need support in this lesson?

NATIONAL CURRICULUM LINKS

Year 4 Number – addition and subtraction

Add and subtract numbers with up to four digits using the formal written methods of columnar addition and subtraction where appropriate.

Year 4 Number – number and place value

Solve number and practical problems that involve addition and subtraction with increasingly large positive numbers.

ASSESSING MASTERY

Children can quickly make mental calculations when adding and subtracting 1s, 10s, 100s and 1,000s. Children can explain their method, demonstrating a deep understanding of place value, and can solve related problems in a range of contexts.

COMMON MISCONCEPTIONS

Children may have place value misconceptions, i.e. they may think $3,423 + 100 = 4,423$. Ask:

- Can you put the numbers into a place value grid to help?

STRENGTHENING UNDERSTANDING

Give children the opportunity to practise adding 1, 10, 100, 1,000 to a range of numbers with a place value grid to help. Repeat until children can calculate place value additions and subtractions mentally.

GOING DEEPER

Give children a variety of missing number place value problems which will require them to think more deeply about the relationship between digits and what information they can use to find the missing numbers. For example, $3,487 + 2,000 = ?$, $1,298 - 70 = ?$, $6,815 + ? = 6,819$, $2,731 - ? = 2,131$.

KEY LANGUAGE

In lesson: more, fact, add, addition, subtract, subtraction

Other language to be used by the teacher: place value, thousands (1,000s), hundreds (100s), tens (10s), ones (1s), add, subtract, reduce, increase

STRUCTURES AND REPRESENTATIONS

Place value grid

RESOURCES

Mandatory: place value counters, base 10 equipment

In the eTextbook of this lesson, you will find interactive links to a selection of teaching tools.

Quick recap

Play 'Say the next number'. Write or say a 3-digit number and ask children to call out or write the next number, focusing on using a counting strategy. Repeat with more 3-digit numbers. Play the game again, but this time ask children to say the previous number.

Discover

WAYS OF WORKING Pair work

ASK

- Question 1 a): What is the same about 3, 30, 300 and 3,000? What is different?
- Question 1 b): Can you explain your answer?

IN FOCUS Ask children what is similar and what is different about +3, +30, +300 and +3,000. Doing this will help them to think about the relationship and connections between these numbers.

PRACTICAL TIPS For this activity, some children may benefit from representing the numbers in the place value grids with concrete objects – use base 10 equipment for this.

ANSWERS

Question 1 a):

Th	H	T	O
3			
	3		
		3	
			3

Question 1 b): $4,256 + 3 = 4,259$

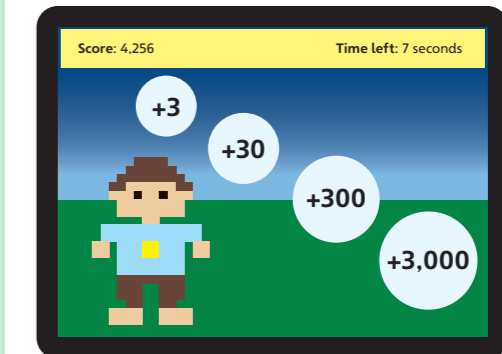
$$4,256 + 30 = 4,286$$

$$4,256 + 300 = 4,556$$

$$4,256 + 3,000 = 7,256$$

Add and subtract 1s, 10s, 100s, 1,000s

Discover



- Make Reena's score of 4,256 with place value counters.
- Show how Reena's score will change if she catches another bubble.

80

PUPIL TEXTBOOK 4A PAGE 80

Share

WAYS OF WORKING Whole class teacher led

ASK

- Question 1 a): How many 1,000s are there? How many 100s? 10s? 1s?
- Question 1 b): Can you explain what has happened in each of the answers? Which digits change? Which digits stay the same?

IN FOCUS The place value grids support children with their understanding of place value. Count the counters in the grids aloud as a whole class – doing this will help children understand the numbers at a deeper level, and will also help them to make comparisons between numbers.

Share

Th	H	T	O
4	2	5	6
4	2	5	9
4	2	8	6
4	5	5	6
7	2	5	6

4,256 + 3 = 4,259

4,256 + 30 = 4,286

4,256 + 300 = 4,556

4,256 + 3,000 = 7,256

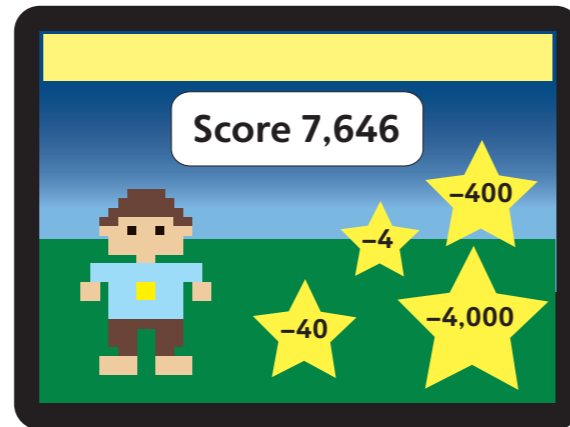
81

PUPIL TEXTBOOK 4A PAGE 81

Think together

1 Ellie's score is 7,646.

Th	H	T	O



How would each star change Ellie's score?

a)

Th	H	T	O

 $7,646 - 4 = \square$

b)

Th	H	T	O

 $7,646 - 40 = \square$

c)

Th	H	T	O

 $7,646 - 400 = \square$

d)

Th	H	T	O

 $7,646 - 4,000 = \square$

2 Lewis has scored 8,888. Show how his score would change each time.

- a) $8,888 - 500 = \square$ c) $\square = 8,888 - 5,000$
 b) $8,888 - \square = 8,883$ d) $8,838 = 8,888 - \square$



3 a) Max has scored 3,869 points.
 He hits a +5,000 bubble, then a -2,000 star.
 What will his score be now?

I wonder what happens if I do this calculation in a different order.

I will combine the bubble and the star first, to work out how Max's score changes.



b) Jamilla has 4,545 points.
 She hits a star, then a bubble.
 Now she has 4,555 points.
 What star and bubble could she have hit?
 Find five possible answers.

Add and subtract 1s, 10s, 100s, 1,000s

→ Textbook 4A p80

1 Complete these calculations.

a)

Th	H	T	O
● 1,000 ● 1,000 ● 1,000 ● 1,000	● 100	● 10 ● 10 ● 10	● 1 ● 1 ● 1 ● 1 ● 1
			● 1 ● 1

$4,137 + 2 = \square$

b)

Th	H	T	O
● 1,000 ● 1,000 ● 1,000 ● 1,000	● 100	● 10 ● 10 ● 10	● 1 ● 1 ● 1 ● 1 ● 1
		● 10 ● 10	● 1 ● 1

$4,137 + 20 = \square$

2 Work out the missing numbers.

Th	H	T	O
● 1,000 ● 1,000 ● 1,000 ● 1,000 ● 1,000	● 100 ● 100 ● 100 ● 100 ● 100	● 10 ● 10 ● 10 ● 10 ● 10	● 1 ● 1 ● 1 ● 1 ● 1
● 1,000	● 100	● 10	● 1

a) $6,666 + 2 = \square$

b) $6,666 - 200 = \square$

$6,666 + 20 = \square$

$6,666 = \square - 200$

$2,000 + 6,666 = \square$

$6,666 - \square = 6,664$

3 Complete these calculations.

a) $3,154 + 500 = \square$

e) $\square + 1,000 = 2,134$

b) $500 + 4,351 = \square$

f) $\square + 4,000 = 4,521$

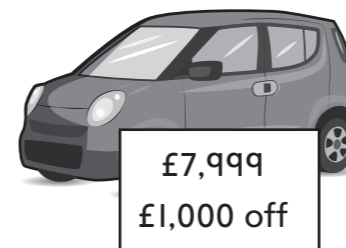
c) $9,786 - 4,000 = \square$

g) $4,014 - 10 = \square$

d) $\square = 7,968 - 400$

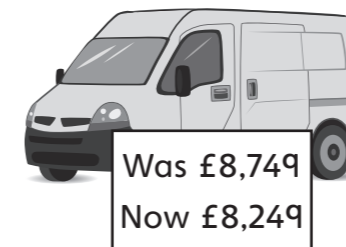
h) $5,001 - \square = 1$

4 a) How much does the car cost now?



£

b) What is the change in price?



£

5 $3,333 + 4,000 = 7,333$

Explain how to use this fact to solve $7,333 - 3,333 = \square$.



Add whole numbers with more than 4 digits 1

Learning focus

In this lesson, children will use the formal written method to add whole numbers with more than four digits, recognising the importance of place value.

Before you teach II

- Do children know how to add 2- and 3-digit numbers?
- Do children know how to make an exchange when using column addition?

NATIONAL CURRICULUM LINKS

Year 5 Number – addition and subtraction

Add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction).

ASSESSING MASTERY

Children can use the formal written method of column addition to add whole numbers with more than four digits.

COMMON MISCONCEPTIONS

Children may not know which place value column to start with when adding two whole numbers together, using column addition. Ask:

- *Why do you always start by adding the column that has the smallest place value in this method?*

Children may not understand the concept of exchanging between columns. Ask:

- *How might a place value grid and counters help you to see what is happening?*

STRENGTHENING UNDERSTANDING

Children should first practise adding whole numbers with two or three digits before moving on to whole numbers with more than four digits. Encourage them to clearly describe the place value of each column, and make sure they understand the importance of this, in particular when making an exchange.

GOING DEEPER

Give children a total and ask how many different ways they can make the total, for example, $_ + _ = 8,876$. This could also be represented on a part-whole model to help children see the link between adding and subtracting.

KEY LANGUAGE

In lesson: add, total, digit, column, place value


Other language to be used by the teacher: exchange, ones (1s), tens (10s), hundreds (100s), thousands (1,000s), ten thousands (10,000s)

STRUCTURES AND REPRESENTATIONS

Place value grid, column addition

RESOURCES

Mandatory: place value counters

 In the eTextbook of this lesson, you will find interactive links to a selection of teaching tools.

Quick recap

Recall addition of numbers within 1,000 or 10,000. Give children quick examples to remind them of the column addition method. Include examples where they have to exchange.

Discover

WAYS OF WORKING Pair work

ASK

- Question 1 a): *How many views are there on Tuesday? How many views are there on Wednesday? What does 'total' mean? How could you add these amounts together?*
- Question 1 b): *What method could you use to find which two days make this total?*

IN FOCUS Question 1 a) requires children to identify two numbers and find the total. This calculation requires children to make one exchange when using column addition. Question 1 b) gives children a total and asks them to work out which two numbers make this total.

PRACTICAL TIPS Make sure children understand that the boy is watching videos and can see the number of views for each video. Show a video on a real video sharing website and ask children to point out the number of views.

ANSWERS

Question 1 a): The total number of video views for Tuesday and Wednesday is 39,328.

Question 1 b): Wednesday and Friday have the total views of 37,592.

Add whole numbers with more than 4 digits 1

Discover



- What is the total number of video views for Tuesday and Wednesday?
- Which two days have a total number of views of 37,592?

80

PUPIL TEXTBOOK 5A PAGE 80

Share

WAYS OF WORKING Whole class teacher led

ASK

- Question 1 a): *What method can you use to add the two numbers together?*
- Question 1 a): *Which place value column do you need to start with? Do you need to make an exchange?*
- Question 1 b): *What method could you use to work out which two numbers make that total? Is there a quicker way?*

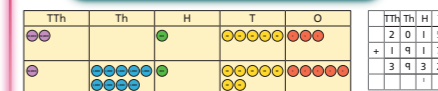
IN FOCUS For question 1 a), take the opportunity to discuss how the word 'total' leads us to carry out an addition for this question and make sure children know which place value column we begin with when adding. Check that children are able to identify and say the larger numbers correctly. The place value grids can be used to reinforce the place value of each digit when carrying out the calculation, for example, ask: *What is 3 ones add 5 ones? What is 5 tens add 7 tens?* Demonstrate why this is important when children are required to carry out one exchange, of 10 tens for 1 hundred.

Discuss the use of the trial and improvement method in question 1 b), emphasising the need to not miss any calculations out. Draw out that this will be time-consuming with such big numbers and encourage children to think flexibly about using a different strategy. For example, Flo's method of adding just the 1s of each number instead to see which gives a total ending with 2.

Share

- Add the number of video views for Tuesday and Wednesday.

I used counters to help me. I set out the work in columns and added them together. I started with the column of least place value.



The total number of video views for Tuesday and Wednesday is 39,328.



I used trial and improvement to find the correct two days. I took my time and was careful not to miss any.

The last digit of Wednesday is 5.
The last digit of Friday is 7.
 $5 + 7 = 12$
Wednesday and Friday have a total number of views of 37,592.

I simply added the last digits.

81

PUPIL TEXTBOOK 5A PAGE 81

Think together

WAYS OF WORKING Whole class teacher led (I do, We do, You do)

ASK

- Question 1: How many views are there on Thursday? How many views are there on Friday? What method can you use to add these amounts together?
- Question 2: Do you need to make any exchanges for these additions? How should we approach question 2 c)?
- Question 3: How do you set numbers out in columns when they have a different number of digits?

IN FOCUS In question 1 and question 2, children practise column addition with differing numbers of exchange. In questions 2 b) and d), children see that they will need to set the problem out themselves. Check that children align the digits correctly. In question 3, children may choose to add two numbers that do not have the same number of digits. Make sure they lay out the column addition correctly. When working out which two numbers have made a given total, encourage children to look at the last digit in each number instead of carrying out the full calculation.

STRENGTHEN Support understanding in question 3 by representing calculations using counters on a place value grid.

DEEPEN For question 3, ask children to work out the total for other combinations of numbers. Encourage them to add numbers that have a different number of digits.

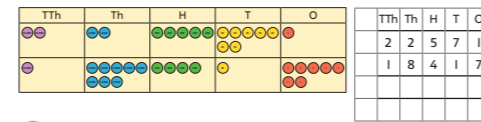
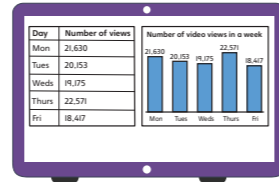
ASSESSMENT CHECKPOINT Can children use the formal written method to add whole numbers with four or more digits where one or more exchanges are required? Make sure they pay attention to laying it out neatly and accurately and identifying the importance of the place value of each column.

ANSWERS

- Question 1: $22,571 + 18,417 = 40,988$
The total number of views is 40,988.
- Question 2 a): $26,915 + 30,241 = 57,156$
- Question 2 b): $37,418 + 4,157 = 41,575$
- Question 2 c): $1,564 + 18,417 = 19,981$
- Question 2 d): $28,019 + 4,096 = 32,115$
- Question 3: Children should work out any two from the following:
- $34,171 + 61,426 = 95,597$
 - $34,171 + 5,458 = 39,629$
 - $34,171 + 1,023 = 35,194$
 - $61,426 + 5,458 = 66,884$
 - $61,426 + 1,023 = 62,449$
 - $5,458 + 1,023 = 6,481$

Think together

- 1 What is the total number of views for Thursday and Friday?



- 2 Work out the following.

a)

TTh	Th	H	T	O
2	6	9	1	5
+	3	0	2	4

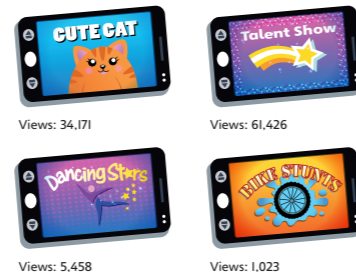
b) $37,418 + 4,157 = \square$

c)

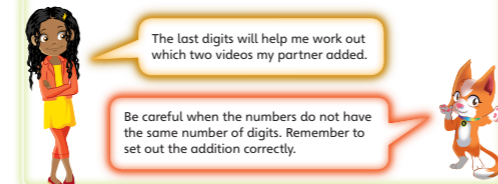
TTh	Th	H	T	O
2	2	5	7	1
+	1	8	4	1

d) $28,019 + 4,096 = \square$

- 3 Here are the total views for four other videos.



Work out the total views for any two of the videos. Then see if a partner can work out which two videos you added together.



Practice

WAYS OF WORKING Independent thinking

IN FOCUS Questions 1 to 3 consolidate understanding of adding two whole numbers using column addition where the information is represented with counters on a place value grid, in a column and abstractly. Question 4 asks children to problem solve and work out missing digits in addition calculations while linking to subtraction.

Question 6 introduces a context for adding two whole numbers that have a different number of digits.

STRENGTHEN Encourage children to use counters on a place value grid to support understanding and, when the calculation is not given in a column layout, encourage them to write it in columns.

DEEPEN Explore question 4 in more depth by giving other missing number problems. Question 5 can be explored further by saying numbers for children to add together mentally, rather than using a written method.

THINK DIFFERENTLY In question 5, numbers are given in words and children need to write these as numerals in order to work out the total. Some children may be able to work out the answers without using column addition.

ASSESSMENT CHECKPOINT Children are confident in using column addition to add whole numbers with four or more digits.

ANSWERS Answers for the Practice part of the lesson can be found in the Power Maths online subscription.

Reflect

WAYS OF WORKING Pair work

IN FOCUS This Reflect activity checks understanding of adding two whole numbers with four or more digits. Encourage children to explain how they would carry out the calculation as well as actually answering it. Look for children who are able to do this without any support.

ASSESSMENT CHECKPOINT Assess if children can correctly explain how to find the total of two whole numbers, emphasising the importance of the place value of each column, and identifying the need to make exchanges.

ANSWERS Answers for the Reflect part of the lesson can be found in the Power Maths online subscription.

After the lesson

- Can children show how to use column addition to add whole numbers with four or more digits?
- Do children understand the importance of a neat and accurate layout for this method?
- Which children needed to use counters on a place value grid for support?

Add whole numbers with more than 4 digits

1 Work out the following additions.

a)

TTh	Th	H	T	O
3	6	4	5	9
+	2	9	2	0

b)

TTh	Th	H	T	O
1	8	7	2	4
+	2	4	1	0

c)

TTh	Th	H	T	O
5	7	8	8	
+	7	2	0	8

d)

TTh	Th	H	T	O
3	9	1	7	5
+	4	2	3	4

e)

TTh	Th	H	T	O	
1	5	2	6	1	
+			9	8	4

2 Kate works out $53,175 + 4,362$.

a) What mistake has Kate made?

TTh	Th	H	T	O	
5	3	1	7	5	
+	4	3	6	2	
	9	6	7	9	5

b) What is the correct answer to the addition?

TTh	Th	H	T	O
+				

3 Solve the following calculations.

a) $17,270 + 24,195$

b) $45,907 + 33,284$

4 Work out the missing digits.

a)

TTh	Th	H	T	O
3				
+	2	6	1	
	1	6	4	8

b)

TTh	Th	H	T	O	
7	3	8	2		
+			3	9	5
	7	8		0	

5 What is ...

a) five more than four hundred thousand?

b) fifty more than four hundred thousand?

c) five thousand more than four hundred thousand?

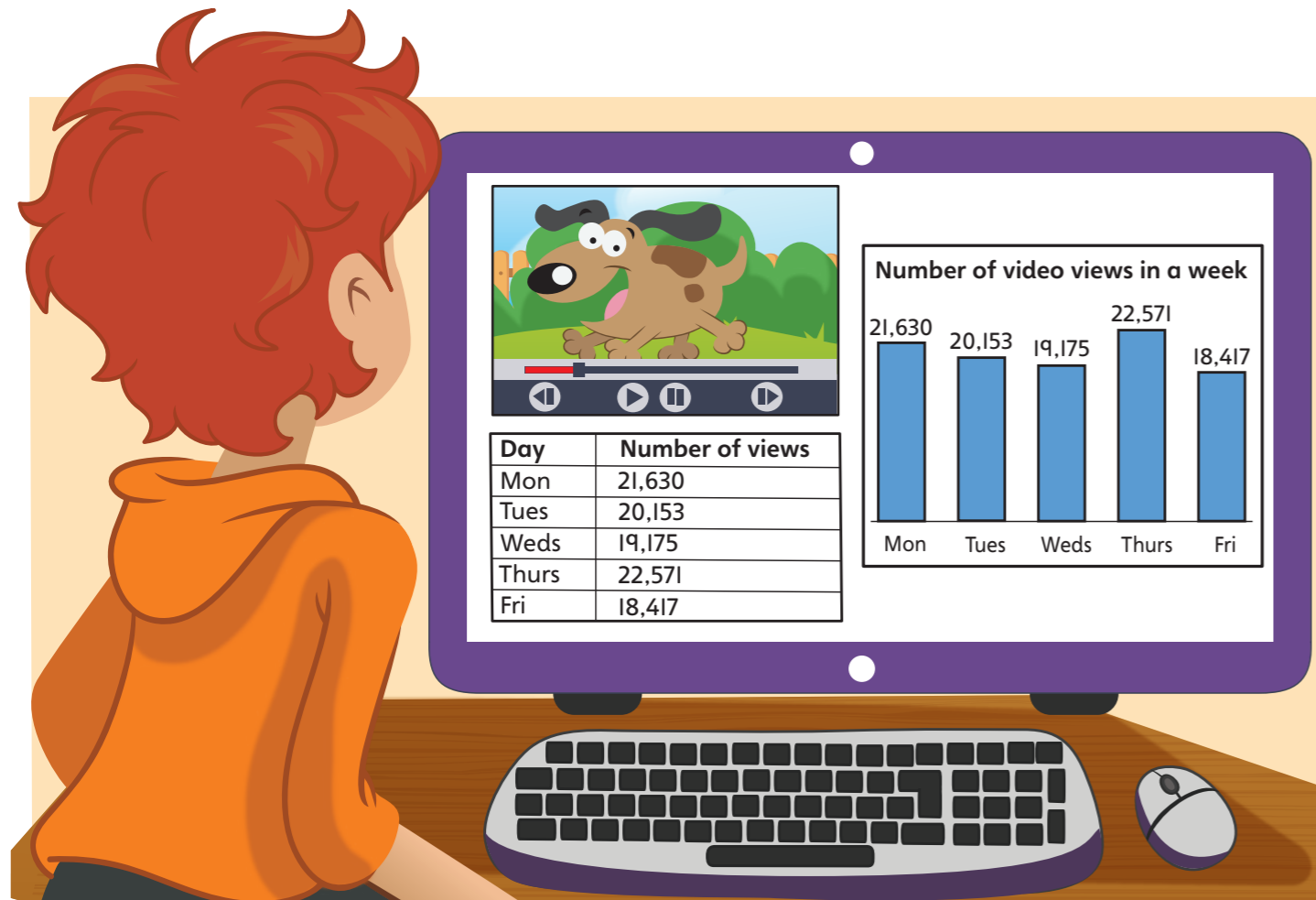
d) five thousand more than forty thousand?

6 Lila plays a computer game. On the first level she gets 26,500 points. On the second level she gets 2,300 more points than the first level. How many points does she score in total?

Reflect Explain to a partner how to work out $42,380 + 24,526$. Explain the steps that they should use.

Add whole numbers with more than 4 digits 1

Discover



- What is the total number of video views for Tuesday and Wednesday?
- Which two days have a total number of views of 37,592?

Share

- Add the number of video views for Tuesday and Wednesday.

I used counters to help me. I set out the work in columns and added them together. I started with the column of least place value.



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

	TTh	Th	H	T	O
	2	0	1	5	3
+	1	9	1	7	5
	3	9	3	2	8

The total number of video views for Tuesday and Wednesday is 39,328.

- | | TTh | Th | H | T | O |
|------|-----|----|---|---|---|
| Mon | 2 | 1 | 6 | 3 | 0 |
| Tues | + | 2 | 0 | 1 | 5 |
| | 4 | 1 | 7 | 8 | 3 |

	TTh	Th	H	T	O
Mon	2	1	6	3	0
Weds	+	1	9	1	7
	4	0	8	0	5

	TTh	Th	H	T	O
Weds	1	9	1	7	5
Fri	+	1	8	4	1
	3	7	5	9	2

I used trial and improvement to find the correct two days. I took my time and was careful not to miss any.



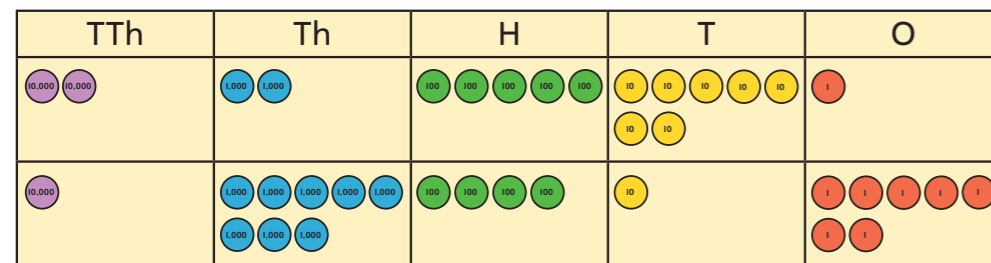
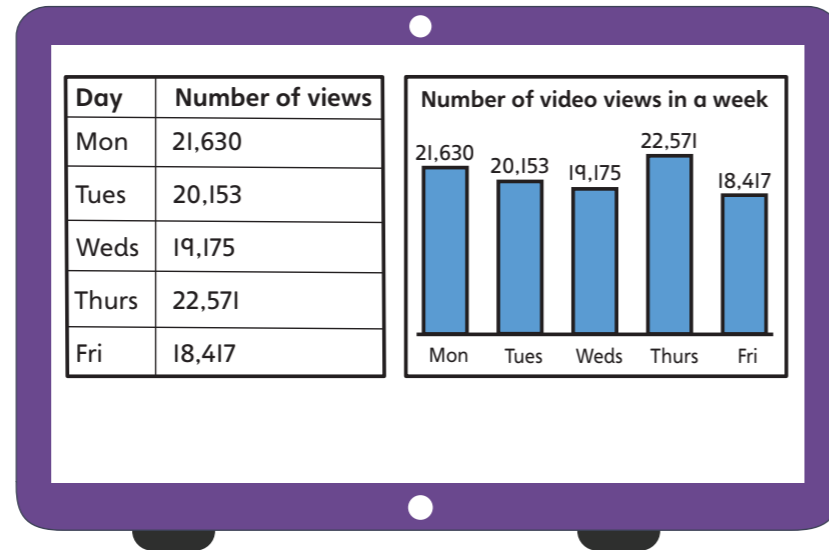
The last digit of Wednesday is 5.
 The last digit of Friday is 7.
 $5 + 7 = 12$
 Wednesday and Friday have a total number of views of 37,592.

I simply added the last digits.



Think together

1 What is the total number of views for Thursday and Friday?



TTh	Th	H	T	O
2	2	5	7	1
1	8	4	1	7

2 Work out the following.

a)

	TTh	Th	H	T	O
	2	6	9	1	5
+	3	0	2	4	1

c)

	TTh	Th	H	T	O
		1	5	6	4
+	1	8	4	1	7

b) $37,418 + 4,157 = \square$

d) $28,019 + 4,096 = \square$

3 Here are the total views for four other videos.



Views: 34,171



Views: 61,426



Views: 5,458



Views: 1,023

Work out the total views for any two of the videos.

Then see if a partner can work out which two videos you added together.



The last digits will help me work out which two videos my partner added.

Be careful when the numbers do not have the same number of digits. Remember to set out the addition correctly.



Add whole numbers with more than 4 digits 1

1 Work out the following additions.

a)

TTh	Th	H	T	O
●●●	●●●●●● ●	●●●●	●●●●●●	●●●●●● ●●●●
	●●	●●●●●● ●●●●	●●	

	TTh	Th	H	T	O
	3	6	4	5	9
+		2	9	2	0

b)

	TTh	Th	H	T	O
	1	8	7	2	4
+	2	4	1	0	0

d)

	TTh	Th	H	T	O
	3	9	1	7	5
+	4	2	3	3	4

c)

	TTh	Th	H	T	O
		5	7	8	8
+	7	2	0	0	8

e)

	TTh	Th	H	T	O
	1	5	2	6	1
+			9	8	4



Year 6

Unit 2: Four operations (1)



Problem solving – addition and subtraction

Learning focus

In this lesson, children will develop their understanding of the columnar written methods of addition and subtraction where exchanges are sometimes necessary.

Before you teach

- How confident are children with written methods of addition and subtraction?
- Will you need to spend more teaching time on one method than on the others?
- What extra teaching strategies and experiences will you offer children to support each operation?

NATIONAL CURRICULUM LINKS

Year 6 Number – addition, subtraction, multiplication and division

Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.

ASSESSING MASTERY

Children can fluently and efficiently use columnar written methods to solve addition and subtraction problems, including those that involve exchanges. They can explain why and how these methods work and can represent them clearly.

COMMON MISCONCEPTIONS

- Children may confuse the place value headings above the columns. Ask:
- Can you show me the place value headings above each column?
 - Does each number fit its column heading? Explain.

STRENGTHENING UNDERSTANDING

Before the lesson, give children concrete opportunities to experience and revise addition and subtraction, such as building numbers with place value counters or base 10 equipment and adding or subtracting by adding or taking away resources, or using money in context through role playing or visiting a shop.

GOING DEEPER

Encourage children to create their own missing number calculations (for example $456,232 + \underline{\quad} = 563,213$) and use them to challenge a partner.

KEY LANGUAGE

In lesson: addition, total, subtraction, method, column, calculate, calculation


Other language to be used by the teacher: difference, exchange

STRUCTURES AND REPRESENTATIONS

Column addition, column subtraction, bar model

RESOURCES

Optional: place value counters, printed place value grids, base 10 equipment

 In the eTextbook of this lesson, you will find interactive links to a selection of teaching tools.

Quick recap

Ask children to invent a story problem for each of these calculations:

$$25 + 75 = ?$$

$$200 - 150 = ?$$

Discover

WAYS OF WORKING Pair work

ASK

- Question 1 a): How will you find out how many runners actually completed the race?
- Question 1 a): What would be the most efficient and accurate way of calculating this difference? Explain.
- Question 1 b): What calculation is needed here? What do you notice about the numbers in the ones column?

IN FOCUS Question 1 a) offers children an opportunity to calculate the difference between two numbers. Encourage them to discuss and decide what would be the most efficient and accurate method for solving this problem.

Question 1 b) involves an addition that requires an exchange from the ones to the tens. Encourage children to lay the addition out carefully with the digits in the correct columns, and ensure they know how to represent and carry out the exchange.

PRACTICAL TIPS: Children could be encouraged to build the numbers in the picture with place value counters or base 10 equipment to help scaffold their concrete understanding of addition. Discuss with children how they could organise their resources to make the calculations clear, moving towards organising them in columns according to place value.

ANSWERS

Question 1 a): 2,145 runners completed the race.

Question 1 b): $32,145 + 4,307 = 36,452$ is the correct answer. They started with 36,452 bottles of water.

Share

WAYS OF WORKING Whole class teacher led

ASK

- Question 1 a): Do any of the representations match how you would have solved the subtraction?
- Question 1 a): Which method is more efficient? Explain.
- Question 1 b): What calculation is needed here?
- Question 1 b): How will you lay out your calculation?

IN FOCUS It will be important to use the multiple representations and methods shown in question 1 a) to scaffold children's revision of subtraction and to assess their current confidence and understanding. Children should be encouraged to use each of the methods and representations to help secure the links in their mathematical understanding.

Problem solving – addition and subtraction

Discover



- How many runners completed the race?
- How many bottles of water did they start with?

52

PUPIL TEXTBOOK 6A PAGE 52

Share

a) We need to do the subtraction $2,679 - 534$.

	2,679	
?	534	
Th	H	T
2	6	7
-	5	3
2	1	4
5		

Th	H	T	O
2	6	7	9
-	5	3	4
2	1	4	5

2,145 runners completed the race.

	?	
32,145	4,307	
TTh	Th	H
3	2	1
+	4	3
3	6	4
5	2	

They started with 36,452 bottles of water.

53

PUPIL TEXTBOOK 6A PAGE 53

Think together

WAYS OF WORKING Whole class teacher led (I do, We do, You do)

ASK

- Question 1: What operation is needed to solve this question? How do you know?
- Question 2: Do all parts of this question require the same operation? Explain how you know.
- Question 2 b) and c): Where will you find the information needed to solve this question?
- Question 3: What will you do first? How does the bar model help you?

IN FOCUS Question 1 helps children with their conceptual understanding of addition which requires an exchange. They may benefit from having concrete resources available to them while they solve the question. Encourage them to make the calculation with place value counters while solving the abstract calculation and discuss what is the same and different about the representations. Question 2 offers the opportunity to solve subtraction and addition calculations in context. Make sure children are aware that they need information from the **Discover** section of the lesson.

STRENGTHEN If children are struggling to decide what operation to use for each part of question 2, ask:

- Can you make the problem using resources?
- Does the question suggest you will take away from what you have or add to it? Explain how you know.

DEEPEN Question 3 is a multi-step problem. If children are quick to solve it encourage them to create a similar challenge for a partner. Ask:

- Can you create one which is simple and one which is tricky? How are they the same and how are they different?

ASSESSMENT CHECKPOINT Can children recognise different representations and use them to solve calculations? Do children recognise addition and subtraction calculations in the context of word problems? Do children understand how the columnar methods for addition and subtraction work, and can they use these methods with fluency?

ANSWERS

Question 1: The marathon runners raised £43,937.

Question 2 a): 1,222 runners finished the marathon.

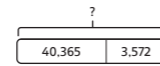
Question 2 b): 1,061 more runners started the Mud Mayhem race than started the marathon.

Question 2 c): 3,367 runners finished both races.

Question 3 a): The value of A is 700.
The value of B is 500.

Think together

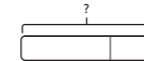
- 1 The runners at the Mud Mayhem race raised £40,365 for charity. The runners at a sponsored marathon raised £3,572 more than that. How much money did the marathon runners raise?



T	H	H	T	O
4	0	3	6	5
+	3	5	7	2

- 2 1,618 runners started a marathon, but 396 of them did not finish.

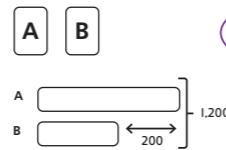
- How many runners finished the marathon?
- How many more runners started the Mud Mayhem race than started the marathon?
- What is the total number of runners who finished the two races?



I will draw a bar model to help me work out whether I need to do an addition or subtraction.



- 3 The sum of these two cards is 1,200. A is 200 more than B. Max is trying to find the value of the cards.



I'm going to draw a bar model to help me work out what I need to do.



Work out the value of the cards.

I think you can add 200 first.

I'm going to subtract 200 first.



Practice

WAYS OF WORKING Independent thinking

IN FOCUS In questions 1, 2 and 3, children read and understand addition and subtraction in the context of word problems. Question 2 challenges children to choose the correct operation.

Question 3 is a multi-step word problem.

STRENGTHEN If children are struggling to decide how to solve the word problems in question 1, ask:

- Can you explain what is happening in the story of the question?
- Is something being added or is it being taken away? How do you know?

DEEPEN Question 5 deepens children's fluency and problem solving when calculating with addition and subtraction. The question is written in a way that requires some 'untangling'. The bar model will support children with this.

THINK DIFFERENTLY Question 4 offers children the opportunity to think differently as they must interpret the numbers given on the number line in the context of the question, to reason about the value of the third number. They are required to find the sum of all numbers so they must remember to complete this final step of the problem.

ASSESSMENT CHECKPOINT Can children use a formal written method with fluency and link their understanding to pictorial representations? Do they draw out what they know and what they need to find to solve problems?

ANSWERS Answers for the **Practice** part of the lesson can be found in the *Power Maths* online subscription.

Reflect

WAYS OF WORKING Independent thinking and pair work

IN FOCUS This question will offer children the opportunity to explore meta-cognitive strategies for their own learning. Which question did they find most challenging and why? Can they make suggestions to help them feel more confident with this sort of question in future?

ASSESSMENT CHECKPOINT Assess children's confidence in identifying and carrying out the calculation needed for a given problem. Do they know which operation or operations are needed, and can they use visual representations to help them? Children should be able to show fluency with these types of calculation by demonstrating their ability to put the calculation into an appropriate context.

ANSWERS Answers for the **Reflect** part of the lesson can be found in the *Power Maths* online subscription.

After the lesson

- Are all children sufficiently confident with the columnar methods for both addition and subtraction?
- What support will you offer to children who are still struggling with one or both of the methods?
- How did this lesson develop children's use of mathematical vocabulary?

Unit 2: Four operations (1), Lesson 3 Date: _____

Problem solving – addition and subtraction

1 A pilot flew 2,438 km on Monday and then 1,330 km on Tuesday.

a) How much further did she fly on Monday than on Tuesday?

b) On Wednesday, the pilot flew 227 km less than on Monday. How far did she fly on Monday, Tuesday and Wednesday in total?

2 Here are two cars.

a) What is the total cost of the two cars?

b) What is the difference in the price of the cars?

PUPIL PRACTICE BOOK 6A PAGE 38

Unit 2: Four operations (1), Lesson 3

3 On Tuesday, Jen drives 150 km more than she did on Monday. On Wednesday Jen drives 150 km more than she did on Tuesday. On Monday she drives 127 km. The bar model represents the situation.

How far does Jen drive in total Monday to Wednesday?

4 These numbers are on a number line. B lies half-way between A and C. What is the sum of A, B and C?

PUPIL PRACTICE BOOK 6A PAGE 39

Unit 2: Four operations (1), Lesson 3

5 Amelia scored 29,750 fewer points than Bella. Bella scored 15,200 points, then 21,500 points. How many points did they score altogether?

Reflect

Which question in this lesson did you find the most challenging? What did you find challenging about it?

PUPIL PRACTICE BOOK 6A PAGE 40

Problem solving – addition and subtraction

Discover



- I** a) How many runners completed the race?
- b) How many bottles of water did they start with?

Share

a) We need to do the subtraction $2,679 - 534$.

2,679	
?	534

	Th	H	T	O
	2	6	7	9
-		5	3	4
	2	1	4	5

I used a bar model to help me see what to do.



Th	H	T	O
● 1,000 ● 1,000	● 100 ● 100 ● 100 ● 100 ● 100	● 10 ● 10 ● 10 ● 10 ● 10	● 1 ● 1 ● 1 ● 1 ● 1
	● 100	● 10 ● 10	● 1 ● 1 ● 1 ● 1

2,145 runners completed the race.

b)

?	
32,145	4,307

	TTh	Th	H	T	O
	3	2	1	4	5
+		4	3	0	7
	3	6	4	5	2
				1	

I made sure my columns lined up.

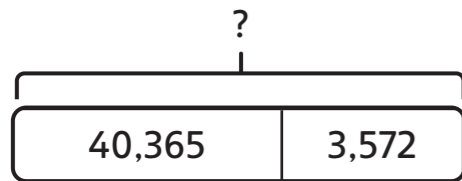


They started with 36,452 bottles of water.

Think together

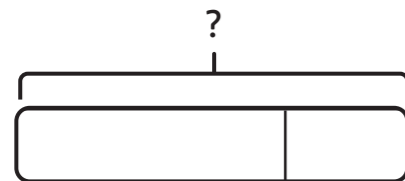
- 1 The runners at the Mud Mayhem race raised £40,365 for charity. The runners at a sponsored marathon raised £3,572 more than that.

How much money did the marathon runners raise?



	TTh	Th	H	T	0
	4	0	3	6	5
+		3	5	7	2

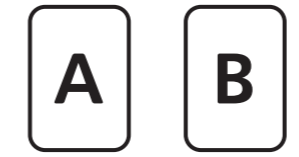
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 - How many more runners started the Mud Mayhem race than started the marathon?
 - What is the total number of runners who finished the two races?



I will draw a bar model to help me work out whether I need to do an addition or subtraction.



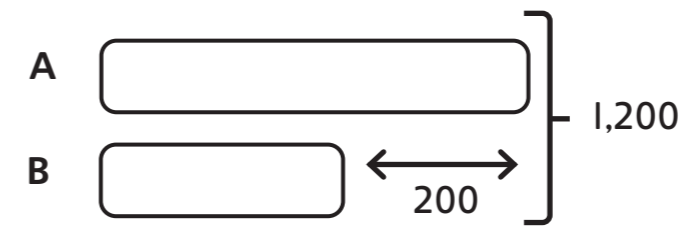
- 3 The sum of these two cards is 1,200. A is 200 more than B. Max is trying to find the value of the cards.



I'm going to draw a bar model help me work out what I need to do.



Max



Work out the value of the cards.

I think you can add 200 first.



I'm going to subtract 200 first.



