Unit 12
Subtraction

Mastery Expert tip! "Support children in recognising the related addition number bonds to 10 to help them quickly identify subtraction bonds and begin to see the inverse relationship between addition and subtraction."

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

Subitise (recognise quantities without counting) up to 5

Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts

WHY THIS UNIT IS IMPORTANT

This unit builds on the concept of number bonds to 10, this time focusing on subtraction number bonds. Children will work with part-whole models to 'break apart' 10 and identify the different bonds created. Children will be introduced to the 'finding a missing part' structure of subtraction from 10. This unit gives children the opportunity to see the inverse relationship between addition and subtraction. Children should use their knowledge of addition number bonds to 10 to help them.

WAYS OF WORKING

Children should be provided with part-whole models and counters to support their learning in this unit. Where possible, teachers should encourage children to act out the questions in groups to help them to clearly see what is happening within calculations.

WHERE THIS UNIT FITS

➔ Unit 11: Number bonds to 10

➔ **Unit 12: Subtraction**

➔ Unit 13: Exploring patterns

In this unit, children will continue exploring subtraction, now looking specifically at the number bonds to 10. These are shown using counters and the part-whole model, which have both been used before. Children will begin to work with subtraction number bonds, following the 'missing part' structure.

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

Number – addition and subtraction

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

A solid understanding of the number bonds to 10 is the foundation of understanding all number bonds.

ASSESSING MASTERY

Children who have mastered this unit will be able to:
- recognise, understand and use the vocabulary linked to number bonds and subtraction
- understand the structure of subtraction and finding a missing part
- identify how many are left when a variety of numbers are subtracted from 10
- begin to see the inverse relationship between addition number bonds to 10 and subtraction number bonds to 10

COMMON MISCONCEPTIONS	STRENGTHENING UNDERSTANDING	GOING DEEPER
Children may not recognise that the children/counters that have been removed have been taken away as they can still see them.	Consider temporarily covering the part containing counters using your hand so that children understand that they have been taken away.	Once the children identify how many should be taken away, they could be asked to remove the necessary number of counters and record the corresponding numeral in the part circle.
Children may verbally create addition number bonds by recombing the parts in the part-whole model.	Arrow heads could be drawn on the 'arms' of the part-whole model to remind children of the direction in which they are working.	Children could create a subtraction number bond to 10, then be challenged to identify the related addition calculation using the part-whole model they have created.

STRUCTURES AND REPRESENTATIONS

Part-whole model: Part-whole models allow children to see the breaking apart of a whole aspect of the subtraction number bonds. Children can physically move/take away counters from the whole and easily see the missing part.
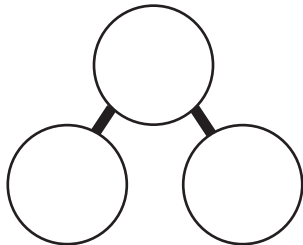
Counters: Counters can be placed in the part-whole model and physically moved into parts. Small groups of counters can help children develop their subitising.

RESOURCES

Mandatory: part-whole model (photocopiable 23), counters

Optional: visuals/resources for 10 noisy parrots song, beanbags, buckets, large 0 to 10 digit cards (photocopiable 34), chalk

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:

- altogether
- take away
- how many
- number bond
- whole
- part
- total
- recombine
- leave
- group
- subtract
- add
- left
- count
- break
- make

Subtraction

Learning focus

This week, children will continue exploring subtraction, now looking specifically at the number bonds to 10. These are shown using counters and the part-whole model, which have both been used before. Children begin to work with subtraction number bonds, following the 'missing part' structure.

Small steps

→ Previous step: The part-whole model to 10
→ **This step: Subtraction**
→ Next step: Making simple patterns

COMMON MISCONCEPTIONS

Children may struggle to see that breaking a whole into parts can be represented as subtraction. Focused discussions on how the whole being made smaller links to subtraction should help children to understand this concept. Using concrete resources and part-whole models will also be vital in helping children to see what is happening in the stories/calculations.

KEY LANGUAGE

In lesson: altogether, whole, leave, left, take away, part, group, count, how many

Other language to be used by the teacher: total, subtract, break, number bond, recombine, add, make

STRUCTURES AND REPRESENTATIONS

counters, part-whole models

RESOURCES

Mandatory: part-whole model (photocopiable 23), counters

Optional: small world people/images of children, beanbags, buckets, large 0 to 10 digit cards (photocopiable 34), chalk, hoops, till, money, items to buy, price tags, shopping bags, sand, small objects to bury, spades, whiteboard pens

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
Treasure	Outdoor area	Put children in teams. Each team should have a chalked or hoop part-whole model with 10 beanbags in the whole circle. On the whistle, children should take it in turns to move one beanbag at a time into the part circle. After 5–10 seconds, blow the whistle to signal the children to stop. The first team to identify the subtraction number bond shown with their part-whole model wins the point. Reset the beanbags and play again.	Chalk/hoops, beanbags
Shopkeepers	Role-play area	Provide children with shop resources: till, 1p coins, items with price tags etc. Ensure all items are priced within 10p. When children are 'paying' for items, encourage them to state how much money they had, how much money they gave away to the shopkeeper and how much money they have left. You could give more confident children 10p coins and the shopkeeper could give them change in pennies.	Role-play resources: till, money, items to buy, price tags, shopping bags, blank part-whole models to calculate money left/change
Buried treasure	Sand area	Have 10 objects that can be buried in the sand. Ask children to look away and count to 10. Whilst children are counting, hide some of the objects under the sand. Once children are ready, get them to identify how many there were at the start, how many are left and therefore work out how many must be hidden. Once an answer has been worked out, children can dig for the treasure to see if they were correct.	Sand, small objects to bury, spades, laminated blank part-whole models, whiteboard pens
Quick cards	Maths area	Shuffle a set of 0 to 10 digit cards and put them face down on the table. Tell children that you will turn a card over and the first child to tell you what would be left if you took the amount on the card away from 10 wins a point. The winner is the first child to gain 10 points.	0 to 10 digit cards, counters, blank part-whole models

Day 1

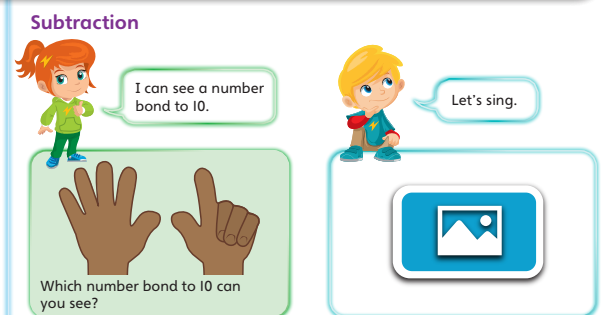## Learning focus

Identify number bonds to 10

Before you teach ⏸

- Can children count up to 10 objects?
- Do children understand that groups can be split into smaller parts?
- Do children know their addition number bonds to 10?
- Do children understand parts being removed as a form of subtraction?

Starter

Unit 12 Subtraction

Subtraction

I can see a number bond to 10.

Let's sing.

Which number bond to 10 can you see?

PREREQUISITE CHECK

PREREQUISITE CHECK Picture of a pair of hands showing the number bond 7 and 3.

WAYS OF WORKING Whole class

IN FOCUS Using the image provided, encourage children to identify the shown number bond to 10. Once the shown number bond has been identified, challenge children to find other ways of showing number bonds to 10 on their fingers. This activity gives children the opportunity to recap number bonds to 10 and the concept of parts and whole; more specifically, different parts creating the same whole.

ASK

- *What number bond can you see?*
- *What are the parts?*
- *What is the whole?*
- *Can you show 10 in a different way?*
- *Can there be different parts?*
- *What do you notice about the whole?*

Song: 10 noisy parrots
10 noisy parrots up in a tree,
Fluffing up their feathers, squawking 'Look at me!'
1 parrot slipped as it hopped around,
Fell from the tree and flew down to the ground.

9 noisy parrots up in a tree …
…
1 noisy parrot up in a tree,
Fluffing up its feathers, squawking 'Look at me!'
Then it slipped as it hopped around,
Fell from the tree and flew down to the ground.

STIMULUS

STIMULUS Song: 10 noisy parrots

WAYS OF WORKING Whole class

IN FOCUS The song in the stimulus revisits the concept that 10 can be made up of different pairs of numbers, which could be recorded or acted out as children sing. The song provides a context for finding number bonds to 10 as the total number of parrots in the tree and on the ground is always 10. Encourage children to count the number of parrots in and out of the tree after each verse to understand that there are still 10 in total. When questioning children between verses, make links to subtraction and removing parrots when identifying bonds to 10.

ASK

- *How many parrots are there altogether?*
- *How many parrots are in the tree?*
- *How many parrots are on the ground?*
- *Does the total number of parrots change?*
- *How many parrots have been taken away?*
- *How many parrots are left?*

GET ACTIVE Ask 10 children to take on the role of the parrots in the song and stand up. As the rest of the class sing the song, children should jump to sit down at the appropriate points. After each verse, pause and ask the children to look at how many children are standing and how many are sitting down. Explain that the number of children sitting down has been taken away from the whole and link to number bonds to 10.

Alternatively, children could be given counters to represent the parrots in the song and they could line them up and then move them one at a time at the appropriate parts of the song. Children should be encouraged to move the final counter each time and discuss how the parts are changing when some are taken away.

Day 2

Learning focus

Using subtraction to identify a missing part to 10

Discover

WAYS OF WORKING Whole class or small groups
Have an area marked out where the children to 'act out' the image and question.

IN FOCUS The **Discover** question is set at a children's party, which will be the focus for the whole week. There are 10 children on a bouncy castle, with 2 bouncing off. The children represent the subtraction 10 − 2 = 8. Draw the children's attention to the sign stating that 10 children are allowed on. Discuss how the total number of children will always be 10 and whether 2 children getting off links to adding or taking away.

ASK
- *How many children are bouncing?*
- *How many children are getting off?*
- *If we split the 10 children into children who are bouncing and children who are getting off, what would each part be worth?*
- *If there were 10 children bouncing and 2 got off, how many children are left? So, 10 take away 2 is…?*

STRENGTHEN Ask for 10 volunteers to pretend to bounce on a bouncy castle, then ask 2 children to 'bounce off'. Encourage children to see that they are taking away

because some children are leaving. Alternatively, use counters on a ten frame to show the 2 being taken away and the amount left.

DEEPEN Provide children with additional scenarios. *What if one more child jumped off? How many would be left?* Discuss *What will stay the same? What will change?* Encourage children to put the 2 back so that they can begin to see the link between addition number bonds to 10 and subtraction number bonds to 10.

Share

**WAYS OF WORKING** Whole class

IN FOCUS The focus of **Share** is to represent the number bond 10 − 2 = 8 in a part-whole model. Children should be exposed to the 'missing part' structure of subtraction number bonds to 10. The progression from concrete to pictorial is shown by representing the children (concrete) with counters in a part-whole model (pictorial).

ASK
- *How many children are bouncing on the bouncy castle?*
- *How many children are jumping off the bouncy castle?*
- *How many are left? How do you know?*
- *What does the 10 represent?*
- *What does the 2 represent?*
- *Where will the number of children left go?*
- *So, 10 take-away 2 is…?*

STRENGTHEN Begin discussions around children leaving being a form of subtraction, so the numbers will be smaller. Model by placing 2 counters in a 'part' circle. Explain that we have broken the whole into 2 parts. Move the 8 remaining counters into the empty part so the children can clearly see the 2 parts.

DEEPEN Encourage children to recombine the parts to help them begin to see the inverse relationship between
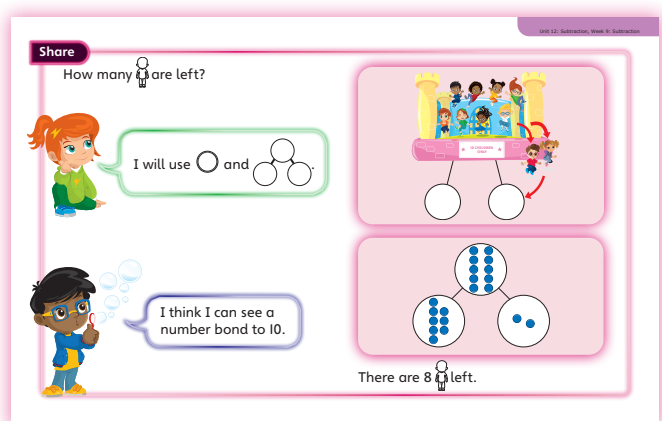
addition number bonds and subtraction number bonds. Ask: *If 3 children instead of 2 jumped off the bouncy castle, how would the part-whole model change?* Support children in exploring other number bonds to 10. *Do we always have an addition and subtraction version?*

GET ACTIVE Give children the opportunity to act out the scenario. Provide hoops or chalked-out part-whole models for the children to investigate breaking wholes into parts.

Day 3

Learning focus

Using subtraction to identify a missing part to 10 when variation is a factor

Think together

WAYS OF WORKING Whole class

IN FOCUS Question ❶ practises the concept of finding a missing part through subtraction. In Question ❷, the number of children getting off is not given. Children will need to identify the number to be taken away, then create the subtraction number bond 10 – 4 = 6 for the part-whole model. Once both questions are completed, children will be exposed to the concept of having the same parts but taking them away in a different order.

ASK

- Question ❶: *If there are 10 children, then 6 get off, how many are left? How do you know? What does the 10 represent? What does the 6 represent? Where will the number of children left go? So, 10 take away 6 is…?*
- Question ❷: *How can we show the children with hats getting off? Has the whole changed? Why? How many children are left on the bouncy castle? So, 10 take away 4 is…? What do you notice about the part-whole model for Question ❶ and the part-whole model for Question ❷? What is the same? What is different? How would the numbers change if the children without hats were to get off instead?*

STRENGTHEN Provide counters and part-whole models to help them move resources around to see the subtraction element and the given parts. Children may struggle with the less obvious parts being taken away in Question ❷.

Use questions from the 'Ask' section and give children time to complete each step before moving on.

DEEPEN Support children in identifying the links between the parts in both questions. Allow them time to investigate whether this is always the case. Can they find any more examples? Encourage children to see the inverse relationship between addition number bonds and subtraction number bonds.

GET ACTIVE Put children in groups of 10 and get them to separate themselves into specified parts. Practise chanting the matching part-whole stem sentences, number bond sentences, etc. Provide chalk to create large part-whole models to use with concrete resources.

Practice: Journal 1

WAYS OF WORKING Independent thinking

IN FOCUS The focus of this **Practice** activity is to see further examples of 10 being broken into parts. This specific question introduces children to the number bonds 10 – 2 = 8 and 10 – 5 = 5. This is the first time in this unit that the children have seen both parts being the same value. The part-whole template gives children a way of recording their thinking and seeing the whole and the parts clearly.

MASTERY CHECKPOINT Children who have mastered this concept can break 10 into 2 and 8, and 5 and 5, and identify which amounts represent the number of children left waiting.

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Day 4

Learning focus

Using number bonds to identify missing parts

Challenge

WAYS OF WORKING Whole class

Have counters and blank part-whole models available for the children to use.

IN FOCUS This **Challenge** introduces children to a new question style. The method for the question is the same as previous questions but the way in which the children are asked has changed. In this question, children are given the part which they are used to finding. Using counters on a part-whole model to explore this question will allow the children to see that either missing part can be found by subtracting the given part.

ASK

- *How many children are there?*
- *What is the whole?*
- *How many children need to be left?*
- *What is this part worth?*
- *How can you work out how many children need to be taken away?*
- *How will you know when you have taken away enough children?*
- *How many children need to get off?*
- *What do you take away from 10 to get 9?*

STRENGTHEN Children should work in a small groups with an adult. Using counters on a part-whole model, children should represent the correct number of children on the bouncy castle to begin with (this is the whole). Encourage children to separate the part they know should be on the bouncy castle to help them to identify how many need to get off. Once identified, ask the children to use the counters to check their answer.

DEEPEN Encourage children to see the relationship between both parts and that either part can be taken away to leave the other. Give the children scenarios where the number of children allowed to bounce changes. For example: only 5 children can bounce – now how many need to get off? This will provide children with the opportunity to explore different subtraction number bonds to 10.

GET ACTIVE Put children in groups of 10. Chalk out a large part-whole model for each group. Give the children subtraction number bond stories and get the children to represent them by moving around in the part-whole. Give points to the group who accurately represent the scenario first to add a sense of competition and urgency.

Day 5

Learning focus

Explore different number bonds to 10 to consolidate understanding

Practical activities

WAYS OF WORKING Whole class

IN FOCUS These games and activities provide children with the opportunity to practise identifying missing parts in subtraction number bond calculations. The competitive, timed elements of the activities encourage children to recall the number bonds rather than having to work them out every time.

GET ACTIVE **Shoot**!

Set up 10 buckets, labelled with the numerals 0 to 10. Give children a beanbag and tell them that they need to throw their beanbag into one of the buckets. Children all start with 10 points and they subtract the number on the bucket in which the beanbag lands. The child with the lowest score, once each child has thrown, wins the round.

Show me

Put children in groups of 10. Using hoops or chalk, mark out a large part-whole model. Ask all children to stand in the 'whole' circle. Shout out a subtraction number bond to 10 calculation or a First, Then and Now story and get the children to represent the calculation by jumping into the part circles. Once children become confident, you could give the groups calculations such as: 10 – ? is 3 and give the children time to move around, investigating the answer.

Charge!

Place large 0 to 10 digit cards around the room (on the floor or stuck to the walls). Share a subtraction number bond to 10 calculation or a First, Then and Now story with the children. Tell children that they need to run/hop/skip to the missing part. For example: 10 – 5 = ? The children would work out the missing part as 5 and get to the numeral 5 as quickly as possible.

Reflect: Journal 2

WAYS OF WORKING Independent thinking

IN FOCUS The **Reflect** question gives children an additional opportunity to explore subtraction number bonds to 10 in a more open-ended context. Children are told that some children get off the bouncy castle but they are not given a specific number. Encourage children to work in pairs to decide on a number of children to bounce off. You may wish to invite children to share their number so that it is clear from the start that there are multiple possibilities. Once children have decided on a number of children to bounce off, they should be encouraged to use concrete resources in the provided part-whole model to identify possible answers. Once children have found one possible answer, they should be encouraged to recombine the parts and find an alternative number bond. Giving the children the opportunity to recombine the groups allows them to see the inverse relationship between addition and subtraction number bonds.

MASTERY CHECKPOINT **Children who have mastered this concept** will be able to represent a subtraction number bond to 10 using resources in a part-whole model. Children will understand the structure of the subtraction calculation/story and be able to apply the taught method efficiently.

Children who have not yet mastered this concept may need some support to use the resources to represent the subtraction story but will be able to identify the missing part answer once the required calculation is shown in the part-whole model.

Children who have fully understood this concept may want to identify a range of possible answers to the question, predicting the answer to some (using their number bond knowledge) before physically using the resources to check. Children may work more systematically and refer to the addition number bonds when discussing answers.