Does not relate finding a difference and complementary addition to the operation of subtraction

Opportunity for: exploring mathematical language

Resources

- Cubes
- Wipe-clean number line

Key vocabulary

how many?	add
difference between	count on
take away	count up
subtract	count back

Teaching activity

Time 10–15 minutes

'We're going to make a word wall today. I'm going to write "difference between" on the first brick because those are the words that we are thinking about today.'

? **Which other words do you think might go on a 'difference between' wall?**

difference between	

Record two numbers, such as sixteen and ten.

? **What is the difference between sixteen and ten?**

> If the child doesn't know how to work it out, draw a number line for them to see what they could do with that.
>
> If they still can't work it out, show them how to hop along the line from 10 to 16 making six hops.
>
> 'I'm starting at 10 and I'm taking six hops to get to 16, so the difference between sixteen and ten is six.'
>
> Try another example.

? **What number sentence can you write to show the calculation you did?**

They might record:

16 – 10 = 6, or 16 – 6 = 10, 10 + 6 = 16, 6 + 10 = 16

**?** **Can you explain how you worked it out?**

Explore the method of working it out and show how to count up from the smaller number to the larger.

If the child needs more support, ask them to make two towers with cubes, perhaps a tower of seven and a tower of five.

[?] **What is the difference between the heights of the two towers?**

Help the child to see the difference – the two extra cubes on the tower of seven.

Record for the child on a number line.

$$5 \quad 6 \quad 7$$
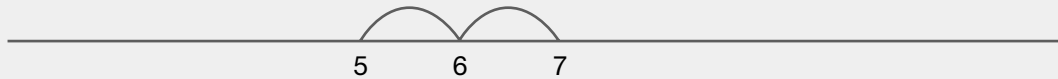
'The difference between five and seven is two.'

$$7 - 2 = 5$$
$$7 - 5 = 2$$
$$2 + 5 = 7$$
$$5 + 2 = 7$$

[?] **Which other number sentences could you have written?**

Explore a range of number sentences as above, such as 6 + 10 = 16, showing on the number line how these could work.

[?] **Let's record some of the words we are using on our 'difference between' word wall.**

difference between	count up	addition

	count back	subtraction	take away

[?] **Why do you think the calculation works whether you do it as an addition or a subtraction?**
(Be led by what the child says but cover the idea that whether you count on or back along a number line, you get the same answer.)

[?] **Can you give me two numbers that have the difference of four?**

[?] **How many different number sentences do you think you could write that have a difference of four?**

Spotlight 1

Does not relate finding a difference and complementary addition to the operation of subtraction

Opportunity for: communicating mathematical ideas

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Two towers

Time 10–15 minutes

Resources

● Cubes

● Whiteboard

Key vocabulary

how many?	add
difference between	count on
take away	count up
subtract	count back

Teaching activity

'Let's look at our word wall again because today we are going to do some more work on what "difference between" means.'

Make two columns or towers each of twelve interlinking cubes. Show the child one tower of cubes.

? **How many cubes are there in this tower?**

Agree there are twelve cubes.

Show the child the second tower of cubes and place the two towers side by side.

? **How many cubes make up the second tower? Did you need to count the cubes?**

Establish that the towers are the same height or the columns the same length. We know that the number of cubes in each tower is the same so the second tower also has twelve cubes.

If the child has to confirm that there are the same number of cubes in the second tower by counting the cubes, repeat the activity.

For example, show a tower of eight cubes.

? **How many cubes are there in this tower?**

Agree there are eight cubes. Show the second tower then hide it.

? **If the second tower is the same height, how many cubes will it have?**

Agree it will have eight cubes too. Reveal the second tower.

? **If we place the two towers side by side, what will happen?**

Establish they will be the same height.

Repeat using other pairs of towers of equal height.

Place four loose cubes on the table and ask the child to add two cubes to each tower.

? **Are the towers the same height? Did you have to count them?**

Agree there was no need to count them, as they are the same height.

? **What would happen if we kept adding the same number of cubes to each tower?**

Establish that no matter how many more we added to each tower, if we add the same number of cubes to each, they will be the same height.

Introduce the word 'difference' into the description, saying that there will be no difference in their heights and the difference in the number of cubes is zero.

Say, 'Suppose the towers were each fifty cubes high,' and ask:

? **What would be the difference in their heights?**

Agree the difference would be zero.

Record on the whiteboard: 50 − 50 = 0.

Ask the child to record some number sentences of their own where the difference is zero. Ask them to read their number statements using the vocabulary 'difference', 'take away' and 'subtraction'.

? **What could we add to our word wall?** *(For example, 'You can have a difference of zero.')*

Spotlight 2

Does not relate finding a difference and complementary addition to the operation of subtraction

Opportunity for: exploring mathematical ideas

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Towers of fourteen

Time 10–15 minutes

Resources	*Key vocabulary*	
● Cubes	how many?	add
● Whiteboard	difference between	count on
	take away	count up
	subtract	count back

Teaching activity

Make two columns or towers of fourteen interlinking cubes. Show the child the two towers.

? **Are there the same number of cubes in each tower? How can we check?**

Establish that putting them side by side is sufficient and we do not need to know the number of cubes in each tower.

Say that there are fourteen cubes in each tower.

? **Can you write down a number statement for the difference between the two towers?**

Ensure the child records on the whiteboard, and can interpret as a difference, the number statement: 14 − 14 = 0.

Remove a cube from one tower and put the towers side by side.

? **What is the difference between the number of cubes in each tower now?**

Establish the difference is one.

? **Can you write down a number statement for the difference between the two towers?**

Ensure that the child records on the whiteboard, and can interpret as a difference, the number statement: 14 – 13 = 1.

> If the child cannot record and interpret the number statement, remind them that the taller tower has fourteen cubes. We took away one cube.
>
> **?** **What is one less than fourteen?**
>
> **?** **What is fourteen take away or subtract thirteen?**

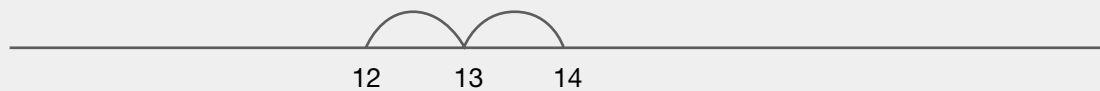Remove a second cube from the shorter tower.

? **How many cubes have we removed now?**

Agree it is two.

? **Record a number statement for this difference.**

Remind the child there are still fourteen cubes in the taller tower. Ensure the child records on the whiteboard, and can interpret as a difference, the number statement: 14 – 12 = 2

> Show the difference of two with the cubes, and you or the child can record it on a number line.
>
>
>
> 12   13   14
>
> 'There is a difference of two.'

? **Can you think of some number sentences where there is a difference of two?**

Repeat using other pairs of towers and larger differences. Ask the child to record various number statements where the difference remains the same.

? **What have you learned today about 'difference between'?**

Spotlight 3

Does not relate finding a difference and complementary addition to the operation of subtraction

Opportunity for: developing mathematical language

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Difference of five

Time 10–15 minutes

Resources

● Cubes including 'ten trains' and 'five trains'

Key vocabulary

|	
how many?	add
difference between	count on
take away	count up
subtract	count back

Teaching activity

'Today we are going to find some number sentences with a difference of five, but first I want you to make some towers or rows of cubes with a difference of zero.'

Follow on from what the child does, recording some number sentences if appropriate.

? **Now can you make two rows of cubes with a difference of five?**

Help the child to make, for example, a row of fifteen and a row of ten.
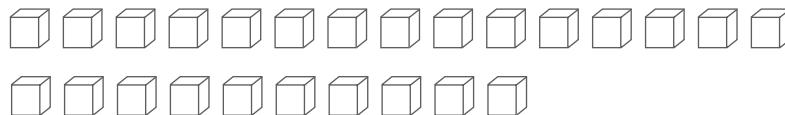
? **What is the difference between fifteen and ten?**

> If the child needs help, make the cubes into towers if the child is more familiar with this and break off the difference to show both towers the same. Then help them to count the five cubes that make the difference.

Help the child to talk about their cubes using a range of the key vocabulary above.

? **Why do you think you get the same answer whether you count up or count back?**

? **Which do you find easier, counting on or counting back?**

? **Have we used any more words that we could put on our word wall?**

? **What number sentence could we write to show this difference?**

> 15 − 5 = 10
> 15 − 10 = 5

? **Which two addition sentences could we write?**

? **Do you think we are taking away or we are adding when we find the difference between two numbers?**

Explore the idea of addition being the opposite of subtraction, and subtraction the opposite of addition (or explain that one undoes the other one; for example, fifteen subtract five is ten, and adding the five back again brings you back to fifteen).

> If the child is unsure about this, go over the sentences, showing that you can use both adding and subtracting, and you still use the same three numbers. Because adding undoes subtraction, you can get the right answer with adding or subtracting.

Do another example: 'The difference between twenty and twenty-five is five.'

? **Tell me what to record to make two subtraction calculations and two addition calculations for the three numbers: twenty-five, twenty and five.**

? **Make another two rows where the difference is five. Is it going to work with really big numbers as well?**

? **Can you put lots of 'ten and five trains' together to make an enormous picture of numbers with a difference of five?**

'Write down any number between one thousand and two thousand. Then write a second number with a difference of five.' (*Clarify that the second number could be five more, or five less, than the first number.*)

Spotlight 4

Does not relate finding a different and complementary addition to the operation of subtraction

Opportunity for: developing mental images

Counting back   **Time** 10–20 minutes

Resources

- Cubes
- Number cards to suit the child (Resource sheets 1, 2 and 3)
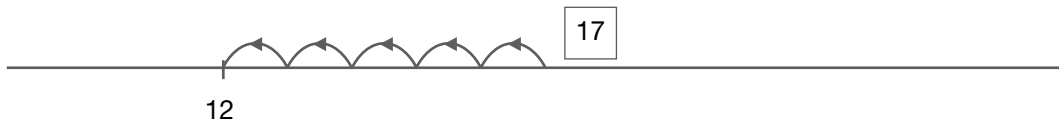- Number lines
- Dice

Key vocabulary

how many?	add
difference between	count on
take away	count up
subtract	count back

Teaching activity

'Today we are going to do an activity with these cards and the dice. We are going to work on counting backwards.'

? **Which do you find easiest, counting forwards or counting backwards?**

Put a number card on an empty number line and ask the child to throw the dice, throwing, for example, 5.

'Tell me a number that has a difference of five if we count back from seventeen.'

Write a number sentence, and draw in hops on the number line.

[?] **If you shut your eyes can you 'see' the number line and the five hops?**

[?] **Shut your eyes again and try to 'see' a different picture of the difference between seventeen and twelve. What did you see?**

> If the child finds this difficult, explore with them which other equipment they might choose to show a difference between seventeen and twelve. This might be a bead string or cubes, etc.
>
> Now use their choice of equipment for a few examples.

'Let's choose another number and you throw the dice to find another difference.' For example, number is fifteen and a dice throw of two.
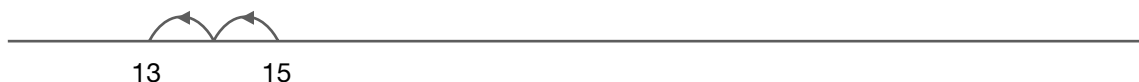
'Let's count back two: one step to fourteen, another step to thirteen.'

'Let's write a number sentence to go with that.'

15 − 2 = 13.

[?] **Did we use any words we haven't yet put on our word wall?** *(For example, 'subtract' or 'take away', or 'count back'.)*

'Show me how to count forwards from thirteen to fifteen.'

[?] **Can you make a number sentence to go with that?** *(For example, 13 + 2 = 15.)*

[?] **Shut your eyes and see if you can see a picture in your head to go with thirteen add two. What is your picture?**

> If the child is unsure about the pictures in their head you might need to repeat this kind of activity with them, often asking them to close their eyes and 'see the pictures in your head'.
>
> It might help to ask the child to draw the pictures in their head. Be very affirming about their pictures, talking them through and helping them to develop these images over the next few weeks.

[?] **If you had to find a difference of a big number, such as the difference between nineteen and seven, would you rather start at the seven and count up, or start at the nineteen and count back?**

[?] **Do you think you would get the same answer whichever way you did it?**

> If the child thinks the answer might be different you will need to work it out on a number line and repeat this Spotlight in different ways, perhaps with cubes or a bead string, or counting on fingers, etc.

Finish by looking at the word wall.

Clarify that subtraction can be worked out by adding.

? **If two numbers have a difference of five, can they both be even numbers?**

Spotlight 5: a learning check

Does not relate finding a difference and complementary addition to the operation of subtraction

Opportunity for: explaining and discussing

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Kangaroo hops   **Time** 5–15 minutes

Resources

- Number cards to suit your children
  (Resource sheets 1, 2, 3 and 4)

- Dice

- Number lines

- At least two children

Check: does the child use key vocabulary?

how many?	add
difference between	count on
take away	count up
subtract	count back

Teaching activity

'This game, **Kangaroo hops**, will help you with finding differences.'

Lay about ten number cards face down on the table.

Children can cooperate in pairs.

How to play

1. The children pick up two numbers and place them on a number line.

2. They work out the difference between the two numbers and that is the number they score.

? **How many hops does the kangaroo need to make to get from thirteen to nineteen?**

? **Would it be the same number of hops to get from nineteen back to thirteen?**

? **How do you know?**

3. Children keep their score. They could tally this in sets of five.

Variations

↑ • Children or pairs can compete, but the pair with the largest score only wins if they can say what the difference is between their score and the other pair.

↑ • Play with the cards facing up. One child throws a dice and they have to pick up two cards with that difference. Children could make up their own way of scoring for this game.

Learning outcomes

By the end of this set of activities, children should be able to:

- tackle related learning tasks with increased motivation and confidence;

- use and understand connected mathematical vocabulary;

- find a difference by counting on and counting back, understanding that the answer will be the same however they work it out;

- write four related number sentences for 'difference between';

- understand that addition undoes subtraction.

Difference race

Time 15–20 minutes

Does not relate finding a difference and complementary addition to the operation of subtraction.

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Resources

- *Blank S-track* (Resource sheet 11b)
- Counters
- 1–4 spinner (Resource sheet 13)
- Rewards
- At least two children (two pairs make a good number of players for this game)

Check: does the child use key vocabulary?

count on	take away
count back	subtract
how many?	add
difference between	

Teaching activity

'Today we are going to play a game, **Difference race**, to help you understand more about what it means to find the difference between two numbers.'

Prepare the *Blank S-track* (Resource sheet 11b) by writing in each space a number of a size appropriate for the group of children, for example numbers 1–8 inclusive randomly around the track. Put a 4 on the starting space.

Players can cooperate in pairs, racing another pair.

How to play

1. Each pair or player puts their counter on the start.

2. The first pair or player spins the spinner and moves that many spaces.

3. That pair or player then declares the difference between their starting point and the number they have landed on.

4. If they are correct they can stay on the space, but if they are wrong they have to move back to where they started.

5. Race to get to the end first.

? **Show me how you worked out that difference?**

? **What picture did you have in your head when you worked it out?**

Variations

↑ • Players can score the number of cubes representing their difference. The winner is the player to have the largest number of cubes.

- Play as in variation above, but the winner with the most cubes only wins if they can work out the difference between their number of cubes and those of the other players.

↑ • Play with larger numbers on the track, for example numbers 3–15.

Learning outcomes

By the end of a set of related activities, children should be able to:

● tackle related learning tasks with increased motivation and confidence;

● use and understand connected mathematical vocabulary;

● explain how to find the difference between two numbers.