Is insecure in making links between addition and subtraction and/or recognising inverses

Opportunity for: recognising relationships

Resources

- Cubes, bead string, 1p coins
- Number line, floor number track
- Two sets of number and symbol cards (Resource sheets 1, 2 and 8)
- Calculator

Key vocabulary

add	goes together
addition	inverse
subtract	opposite
subtraction	other way round
take away	larger
difference between	largest
leaves	smaller

Teaching activity

Time 10–15 minutes

Lay out some number and +, − and = cards.

'We are going to make some number sentences today with the + and the − cards, and we are going to think about how those + and − cards are linked.'

? **I'm going to key in 4 + 6 = 10 on the calculator. If I give it to you, can you use the subtraction key to get back to 4?**

? **Can you make those number sentences with cards?**

Help the child to set out:

| 4 | + | 6 | = | 10 |

| 10 | − | 6 | = | 4 |

Support this with cubes or a bead string or 1p coins.

'Four 1p coins and six more makes ten altogether. If I take away the six again I get back to four.'

? **Check your calculations, using a number line to help.**

Support the child to do this.

Repeat with different numbers. Then go back to some of the cards you have laid out for addition and subtraction and move some of the cards around.

? **Is this number sentence right? How do you know?**

| 4 | + | 10 | = | 6 |

? **What about this one?**

| 4 | − | 6 | = | 10 |

Support the child reading the subtraction sentence.

? **Why isn't this subtraction correct?**

If the child needs support, work out the meaning with cubes.

? **If I have four cubes, how would I take away six cubes?**

Help the child to re-order the cards to make sense, using the cubes to illustrate what is going on.

Try another example.

? **Is this going to work: 3 − 7 = 10?**

? **How could you correct the calculation?**

Help the child to use the key vocabulary above.

Again, work it out with cubes, focusing on the need to match the numbers and order of the calculation to the numbers and symbols.

Finish by choosing three more cards and asking the child to make an addition number sentence and a subtraction one.

Spotlight 1

Is insecure in making links between addition and subtraction and/or recognising inverses

Opportunity for: making connections

Silly sentences

Time 10–15 minutes

Resources

- Cubes
- Number and symbol cards
  (Resource sheets 1 and 2)

Key vocabulary

add	goes together
addition	inverse
subtract	opposite
subtraction	other way round
take away	larger
difference between	largest
leaves	smaller
altogether make	smallest

Teaching activity

'I want you to make two different size rods of cubes that add up to twelve altogether. Then we are going to make some addition and subtraction sentences that use twelve.'

Help the child to record number sentences and to use appropriate vocabulary, for example 'Twelve subtract four leaves eight'.

$$8 + 4 = 12$$
$$12 - 4 = 8$$

? **Now can you make some silly number sentences using the cards?**

4	−	12	=	8

? **Read this number sentence and tell me why I think it is silly.**

Help the child to use a range of the key vocabulary above.

Note: You might want to stick to the usual ways we tend to set out number sentences, but do remember to give children experience with different layouts such as 12 = 4 + 8 (see the whole-class activity below).

'So that we will remember them for next time, let's record two correct addition and two correct subtraction sentences.'

> 8 + 4 = 12
> 12 − 4 = 8
> 4 + 8 = 12
> 12 − 8 = 4

? **How many different ways can you find to make number sentences with twenty, eighteen and two?** *(Clarify that there are four basic sentences – two addition and two subtraction – but you can rearrange cards. For example, you can rearrange 18 − 2 = 16 to 16 = 18 − 2.)*

Spotlight 2

Is insecure in making links between addition and subtraction and/or recognising inverses

Opportunity for: exploring mathematical ideas

● ●●

Make four

Time 10–15 minutes

Resources

● Recording from Spotlight 1
● Cubes

Key vocabulary

add	goes together
addition	inverse
subtract	opposite
subtraction	other way round
take away	largest number
difference between	largest
leaves	smaller
altogether make	

Teaching activity

Talk the child through the recording from last time.

'Today we are going to write four sensible sentences that go with some cube "trains" you are going to make.'

Choose a number suitable for the child, such as sixteen, and ask the child to make a cube 'train' sixteen long.

❓ How could you split that cube 'train' of sixteen?

Clarify that there are many ways you could split it: fifteen and one, fourteen and two, and so on.

> If the child is struggling with that, choose a lower number.
>
> Then you might want to write some of the addition sentences before moving on.

❓ Choose one of the ways of splitting sixteen into two parts and tell me how to write a number sentence that goes with your split.

❓ What other addition sentence could I write?
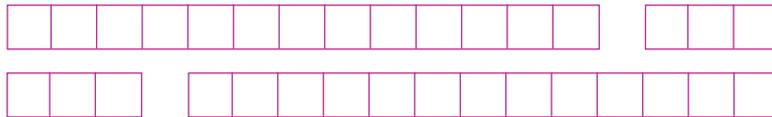
13 + 3 = 16
3 + 13 = 16

Then challenge the child to work out two subtraction sentences that go with these addition sentences.

> Support the child in starting with the largest number, using cubes to illustrate.

13 + 3 = 16
3 + 13 = 16
16 – 3 = 13
16 – 13 = 3

> Repeat with other numbers if the child still needs more help.
>
> You could use a number line or other equipment that the child is familiar with to show the relationship between the numbers.

❓ Do you think we could make two addition and two subtraction sentences for each cube 'train' we made? How do you know?

❓ What if we did it with a hundred cubes?

❓ What is the answer to twenty add thirty? How could you write that?

❓ What is fifty subtract thirty? How could you use the answer to twenty add thirty to get the answer more quickly?

Spotlight 3

Is insecure in making links between addition and subtraction and/or recognising inverses

Opportunity for: exploring mathematical language

....

On the number line

Time 10–15 minutes

Resources

- Cubes or bead strings or coat hanger and pegs
- Number lines
- Number cards (Resource sheets 1, 2 and 3)

Key vocabulary

add	goes together
addition	inverse
subtract	opposite
subtraction	other way round
take away	larger
difference between	largest
leaves	smaller
altogether make	smallest

Teaching activity

'We are going to make four sensible number sentences that go together today. You choose the numbers and I will record the sentences.'

Encourage the child to think for themselves what they could do. If they need help, put out some suitable number cards.

? **Can you mark your starting number on the number line?**

> If the child needs help, let them choose a number and mark it on a number line and select equipment they like working with.

? **If you close your eyes can you imagine some hops along the number line to get to a number bigger than your number, or smaller?** *(For example, if the child wants to start with seventeen, they could add four and work with twenty-one, or they could subtract six and work with eleven.)*

? **Which other number cards will you need if you hop that many?** *(For example, with seventeen hop forward four, they will need cards 17, 4 and 21.)*

Focus on the vocabulary above as they need to talk about their hops. You could tick the words on the list once they are used, noting any that the child tends not to use.

(Keep your recordings for next time.)

? **Have you learned any new words about number sentences that go together?**

? **Explain how you can choose the numbers to make the number sentences that go together.**

'Explain what you think it means to say addition undoes subtraction.'

Spotlight 4

Is insecure in making links between addition and subtraction and/or recognising inverses

Opportunity for: developing mental images

· ·

Round and rounds

Time 10 minutes

Resources

- Recording from Spotlight 3
- Number and symbol cards (Resource sheets 1, 2, 3 and 8)
- Access to counting equipment such as cubes or apples

Key vocabulary

add	goes together
addition	inverse
subtract	opposite
subtraction	other way round
take away	larger
difference between	largest
leaves	smaller
altogether make	

Teaching activity

**?** **Look at what we did last time. Can you remember what we did?**

Again, take careful note of the child's vocabulary.

Ask the child to select some cards that go together, for example 19, 6 and 13.

> If the child is likely to need lots of support you could choose some accessible numbers that the child is comfortable with.
>
> If you think it might help the child, let them choose equipment to support their calculating.

Lay out the cards in a circle. Read diagram from the top.
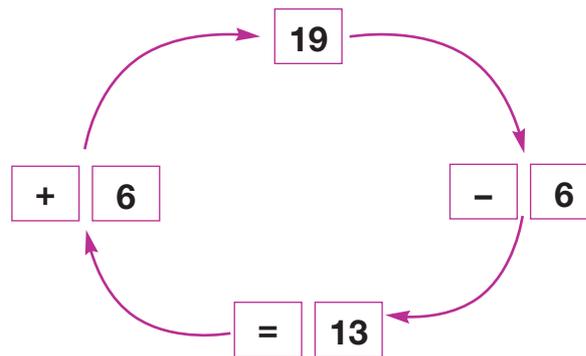
'Nineteen subtract six makes thirteen, then if you add the six back on, you get back to nineteen where you started.'

Let the child choose three more numbers that go together and make another 'round and round' and read it to you. Take one example back to class.

? **Why does this 'round and round' work?**

? **Can you go the other way round?** *(Yes, if you change the operations cards round as well.)*

Spotlight 5: a learning check

Is insecure in making links between addition and subtraction and/or recognising inverses

Opportunity for: explaining and discussing

··

Card triples

Time 5–15 minutes

Resources

- Number cards used in earlier Spotlights
- Three hoops or pieces of paper
- At least four players
- A scorer with a calculator

Check: does the child use key vocabulary?

add	goes together
addition	inverse
subtract	opposite
subtraction	other way round
take away	larger
difference between	largest
leaves	smaller
altogether make	smallest

Teaching activity

'This game, **Card triples**, will help you with understanding how addition and subtraction number sentences go together.'

Lay out some cards that the child is familiar with in the three hoops – the largest numbers in one hoop and smaller ones in the two other hoops. For example, if 5 is in one hoop and 10 is in the other, you need to have 15 in the third hoop, but it adds interest to the game if you just put some numbers randomly.

Children can cooperate in pairs to play.

How to play

| 5 | 10 | 15 | | 3 | 4 | 7 |

1. Pairs of children work together to take one number from each hoop that 'go together' to make a card triple. For example, they could take 3, 4 and 7.

2. They score the number of points for their largest number, in this instance, 7.

3. Then they must say one addition sentence that they can make with the three cards, for example $3 + 4 = 7$. Again, they score 7 if they are correct.

4. They must then make a subtraction sentence to score another 7.

5. The scorer notes the score and can use a calculator to help.

6. Then the other pair selects three cards and makes number sentences in the same way.

7. The pair with the highest score wins.

Variations:

- An easier game is for pairs just to collect card triples and justify why their cards go together.
- Play that first variation at speed, both pairs taking cards as quickly as they can until most of the cards are gone.

? **Why has no-one taken that card?**

- Extend the game by making a two-digit number with cards, for example 27, and making four related number sentences with that two-digit number, for example, $27 − 6 = 21$.

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;

- understand inverses, explaining how addition undoes subtraction;

- choose three related numbers and explain why they are related;

- understand an appropriate way to write an addition and subtraction sentence.