White Rose Maths

Spring - Block 1

Addition & Subtraction

Overview

Small Steps

- Add by counting on
- Find & make number bonds
- Add by making 10
- Subtraction – Not crossing 10
- Subtraction – Crossing 10 (1)
- Subtraction – Crossing 10 (2)
- Related facts
- Compare number sentences

NC Objectives

Represent and use number bonds and related subtraction facts within 20

Read, write and interpret mathematical statements involving addition (+), subtraction (−) and equals (=) signs.

Add and subtract one-digit and two-digit numbers to 20, including zero.

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

Add by Counting On

Notes and Guidance

Children explore addition by counting on from a given number. They begin to understand that addition is commutative and that it is more efficient to start from the largest number.
It is important that children see that they are not just adding two separate numbers or items, they are adding to what they already have.
Ensure children do not include their start number when counting on.

Mathematical Talk

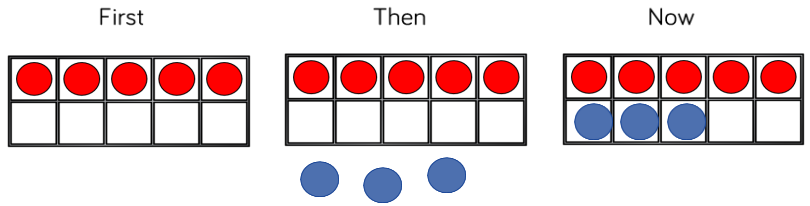
What number did you start with? Then what happened? Now what do I have?

What does each number represent? What do the counters represent?

How can I represent counting on using practical equipment?
How can I represent counting on using a bar model or a number line?

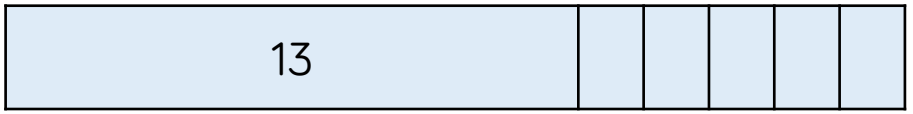
Varied Fluency

Use ten frames to complete the number story.

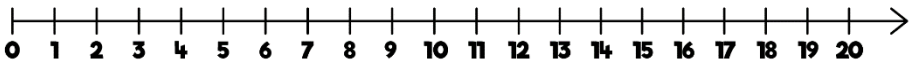


First there were ___ cars in the car park.
Then ___ more cars parked in the car park.
Now there are ___ cars in the car park.

Eva has 13 prize tokens.
She wins 5 more.
How many prize tokens does Eva have now?



Mo starts at 9 and counts on 6 $9 + 6 = \square$
Show his calculation on the number line.



Add by Counting On

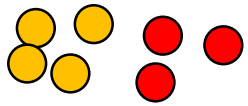
Reasoning and Problem Solving

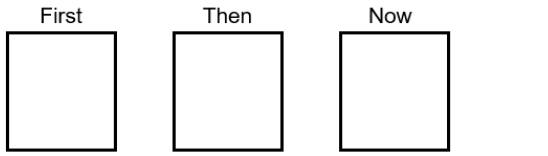
Use the diagram and counters to tell your own number story for these calculations:

$0 + 12 = \_\_\_$

$7 + 0 = \_\_\_$

$14 + \_\_\_ = 17$





Children can come up with a range of contexts where they have an amount that is increasing. Using 'First, then and now' they describe it.

Mo and Jack are working out $11 + 7$

Mo says,

11, 12, 13, 14, 15, 16, 17

Jack says,

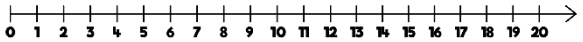
12, 13, 14, 15, 16, 17, 18

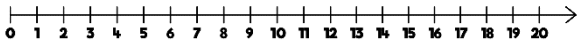
Use a number line to show who is correct.

Jack is correct as he has counted on 7 steps from 11
Mo has incorrectly included 11 when counting.

Ron starts at 9 and adds on 5
Alex starts at 5 and adds on 9
Show their calculations on the number lines.
What do you notice? Does this always happen?

Which method do you like best? Why?





Both children end on 14
This is because $9 + 5$ is equivalent to $5 + 9$

The children can explore their own calculations to understand that addition is always commutative.
They see that Ron's method is quicker because there is less to count on.

Find & Make Number Bonds

Notes and Guidance

Children see that working systematically helps them to find all the possible number bonds to 20
They will use their knowledge of number bonds to 10 to find number bonds to 20
Using examples such as, 7 + 3, 17 + 3 or 7 + 13 encourages children to see the link between bonds to 10 and bonds to 20 and reinforces their understanding of place value.

Mathematical Talk

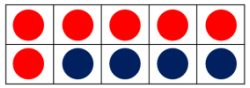
What strategy could you use to make sure you find all the number bonds?

What number bond can we see? How does this help us find the number bond to 20?

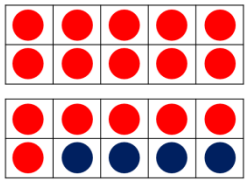
How does knowing your number bonds to 10 help you to work out your number bonds to 20?

Varied Fluency

What number bond is represented in the pictures?

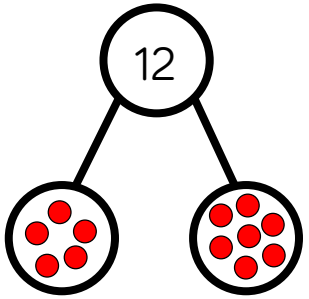


There are ___ red counters.
There are ___ blue counters.
Altogether there are ___ counters.
___ + ___ = ___ ___ + ___ = ___



There are ___ red counters.
There are ___ blue counters.
Altogether there are ___ counters.
___ + ___ = ___
___ + ___ = ___

Continue the pattern to find all the number bonds to 12
How do you know you have found them all?



12 = 12 + 0
12 = 11 + ___
12 = 10 + ___

Find & Make Number Bonds

Reasoning and Problem Solving

Use equipment to represent each of the calculations below.

What is the same?
What is different?

$$7 + 3 = 10$$

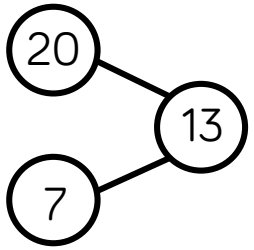
$$17 + 3 = 20$$

$$20 = 7 + 13$$

Explain your thinking.

Children may notice that the = is in a different place.
They might notice that the number of ones remains the same and that a ten has been added to create a number bond to 20
Mathematical equipment such as ten frames or Base 10 will make this clear.

Jack represents a number bond to 20 in the part whole model.



Can you spot his mistake?

Possible response: Jack has put 20 as a part but it should be a whole.

True or false?

There are double the amount of numbers bonds to 20 than there are number bonds to 10

Prove it – can you use a systematic approach?

False – there are 11 number bonds to 10 and 21 number bonds to 20 Children can show this in various ways.

Add by Making 10

Notes and Guidance

Children add numbers within 20 using their knowledge of number bonds.
It is important that children work practically using ten frames and/or number lines to help them see how number bonds to 10 can help them calculate.
They will move towards using this as a mental strategy.

Mathematical Talk

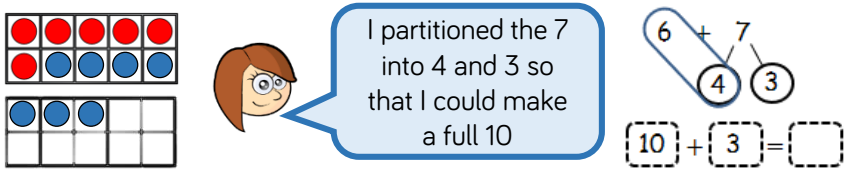
How can you partition a number and use your number bonds to 10 to help you?

How does using the counters help you to see this strategy?

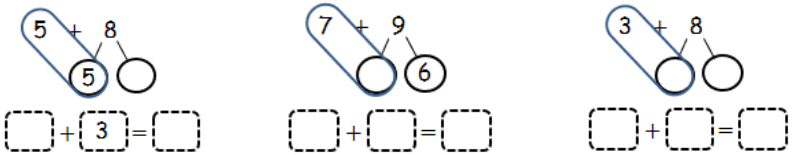
How does using a number line help you to see this strategy?

Varied Fluency

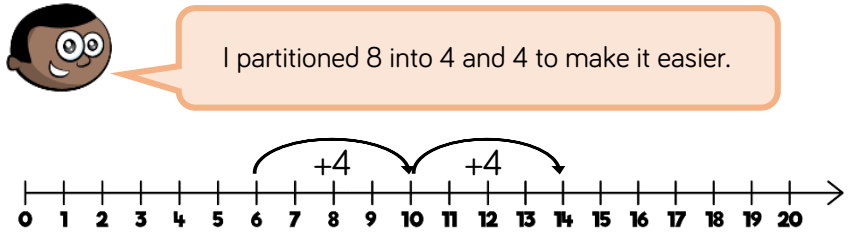
Rosie has used the 10 frames to calculate 6 + 7



Use Rosie's method to complete:



Mo has used a number line to calculate 6 + 8



Use Mo's method to calculate:

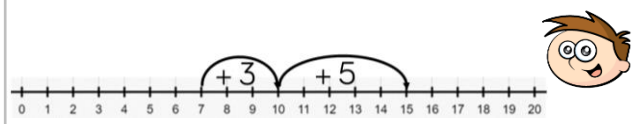
5 + 8 = ☐ 9 + 4 = ☐ 6 + 8 = ☐

Add by Making 10

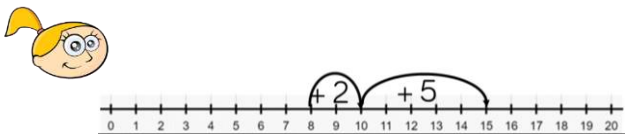
Reasoning and Problem Solving

Teddy and Eva are adding together 7 and 8 using a number line.

Teddy shows it this way:



Eva shows it this way:



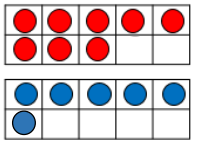
Who is correct?
Explain your answer.

They are both correct because addition is commutative and the answer to both calculations is 15

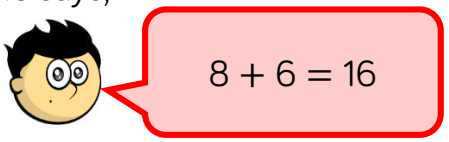
Teddy has started with 7 and partitioned the 8 into 3 and 5 to make 10

Eva has started with 8 and partitioned the 7 into 2 and 5 to make 10

Dexter uses ten frames to calculate eight plus six.



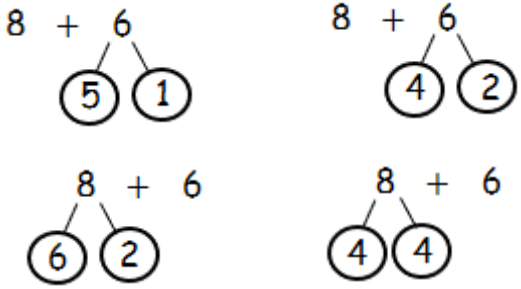
He says,



Do you agree?
Explain why.

Dexter is wrong because the answer should be 14. He should have filled the first ten frame before starting a second one.

Annie is calculating 8 + 6
Which of these methods is most helpful?
Why?



Partitioning the 6 into 4 and 2 is helpful as 8 and 2 make 10

Partitioning the 8 into 4 and 4 is helpful as 6 and 4 make 10

Subtraction – Not Crossing 10

Notes and Guidance

Children build on the language of subtraction, recognising and using the subtraction symbol within 20

The use of zero is important so children know that when nothing is taken away, the start number remains the same or when the whole group is taken away, there will be nothing left.

They will also use the part-whole model alongside practical equipment to reinforce number bonds within 20

Mathematical Talk

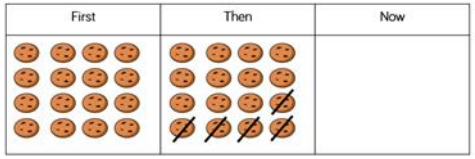
How many objects were there at first? Then what happened to the objects? How many objects are there now?

If Mo ate nothing, what number would we use to represent this? How do we write this as a calculation? What does the zero represent in this calculation?

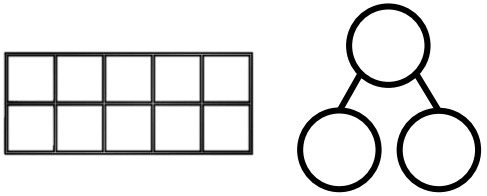
If Mo ate all of the biscuits, what number would we be left with? How do we write this as a calculation? What does the zero represent in this calculation?

Varied Fluency

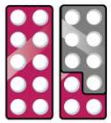
- There are 16 biscuits on a plate. Mo eats 5 of them.
  Complete the sentences.
  First there were ___ biscuits.
  Then ___ were eaten.
  Now there are ___ biscuits.
  16 – 5 = ___



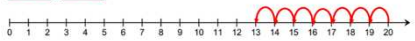
- First there were 9 sheep. Then they all ran away.
  How many sheep are left?
  Use ten frames and counters to represent the sheep.



- Use the number pieces and the number line to complete the number sentences.



20 – 7 = ___



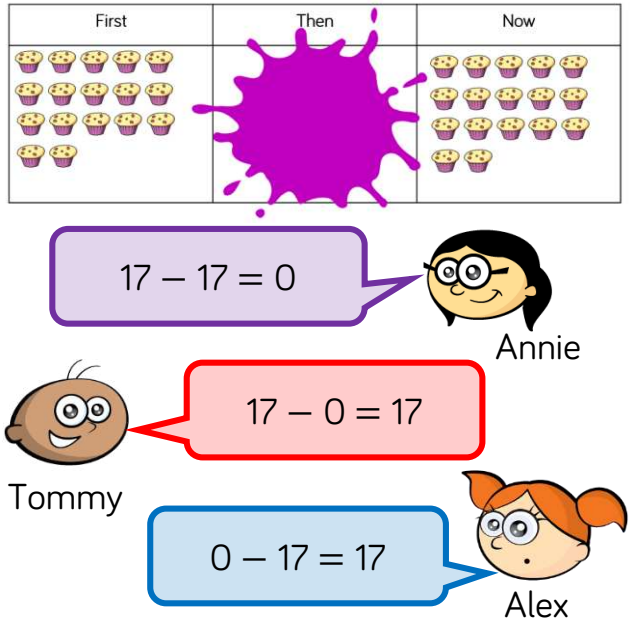
Use this method to calculate:

20 – 8
18 – 6
19 – 4

Subtraction – Not Crossing 10

Reasoning and Problem Solving

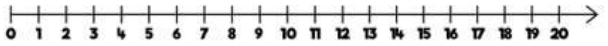
Annie, Tommy and Alex are working out which calculation is represented below.



Can you work out who is correct?
Explain why.

Possible response:
Tommy is correct because first there were 17 cakes and now there are still 17 cakes so zero cakes were eaten.

How many ways can you complete this number sentence?
Use the number line to help you.



$\square - \square = 11$

20 – 9 = 11
19 – 8 = 11
18 – 7 = 11
17 – 6 = 11
16 – 5 = 11 etc.

Subtraction – Crossing 10 (1)

Notes and Guidance

For the first time, children will be introduced to subtraction where they have to cross ten. This small step focuses on the strategy of partitioning to make ten.

Children should represent this using concrete manipulatives or pictorially to begin with. Ten frames and number lines are particularly useful to model the structure of this strategy.

Children will move towards using this as a mental strategy.

Mathematical Talk

How can you partition a number to help you subtract?

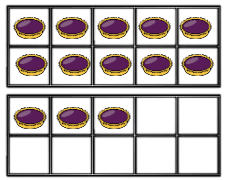
How does using the counters help you to see this strategy?

How does using a number line help you to see this strategy?

Can you think of another way to represent this problem?

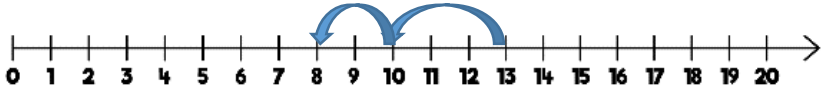
Varied Fluency

First there were 13 jam tarts

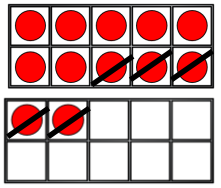


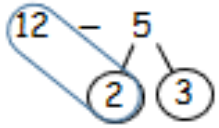
Then 5 were eaten

Now there are 8 jam tarts.



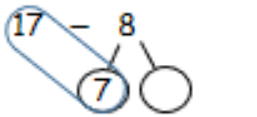
Rosie has used the ten frames to calculate 12 – 5



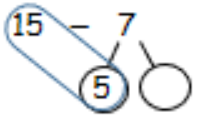


10 – 3 = 7

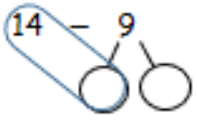
Use her method to complete:



10 – ☐ = ☐



☐ – ☐ = ☐



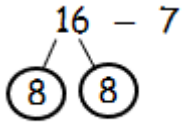
☐ – ☐ = ☐

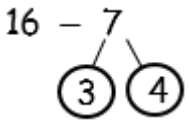
Subtraction – Crossing 10 (1)

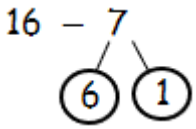
Reasoning and Problem Solving

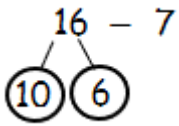
Rosie is calculating 16 – 7

Which of these methods is most helpful? Why?









Could you find a way to partition 16 to help you subtract 7?

Partitioning the 7 into 6 and 1 is useful as Rosie can subtract the 6 to make 10 then subtract the 1

If you partition 16 into 7 and 9, you can subtract 7

Teddy works out 15 – 6
This is Teddy's working out:

15 – 5 = 10 – 1 = 9

Why is Teddy's working out wrong?

Teddy has used the = sign incorrectly.
10 – 1 is not equal to 15 – 5
He should have written:
15 – 5 = 10
10 – 1 = 9

Use <, > or = to make the statements correct.

I can do this without working out any answers.

17 – 5	◯	12 – 5
14 – 4	◯	18 – 8
11 – 7	◯	11 – 4

Is Whitney correct? Explain how you know.

17 – 5 > 12 – 5

14 – 4 = 18 – 8

11 – 7 < 11 – 4

Subtraction – Crossing 10 (2)

Notes and Guidance

Children subtract numbers, within 20, crossing the 10. Children begin to understand the different structures of subtraction (taking away, partitioning, difference).

They use concrete manipulatives and pictorial methods to support their understanding.

One of the most difficult concepts for children is finding the difference where they subtract to calculate how many more.

Mathematical Talk

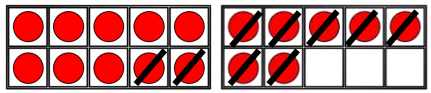
How do the counters and bar models help you to subtract?

Which method would you use to show your thinking and why?

Did you count forwards or backwards? Why?

Varied Fluency

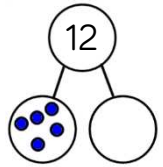
- Complete the number sentences to describe what happens to the sweets.



First there were ___ sweets.
Then ___ sweets were eaten.
Now there are ___ sweets.

□ – □ = □

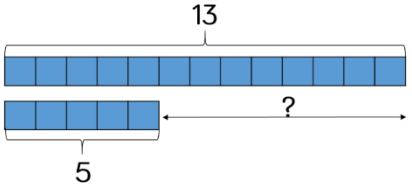
- There are 12 cars in the car park.
5 of them are blue.
How many are red?



□ – □ = □

___ of the cars are red.

- Adam has 13 playing cards.
Oliver has 5 playing cards.
How many more cards does Adam have?



□ – □ = □

Subtraction – Crossing 10 (2)

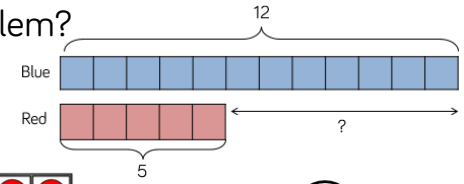
Reasoning and Problem Solving

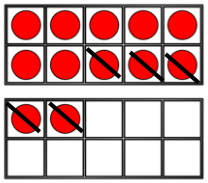
A Max has 12 balloons.
5 of the balloons burst.
How many are left?

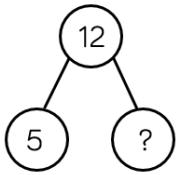
B Max has 12 balloons.
5 of the balloons are red.
There rest are blue.
How many blue balloons does Max have?

C Max has 12 blue balloons and 5 red balloons.
How many more blue balloons than red balloons does he have?

Which method would you use to solve each problem?



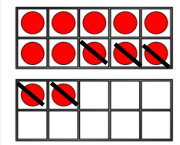




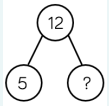
Ask the children to justify which method they would use and why.

Possible answers:

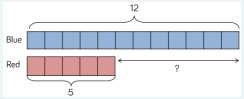
A Take away



B Partitioning



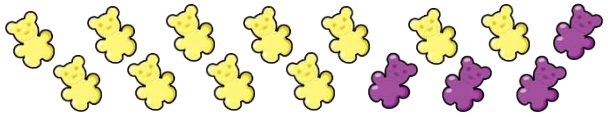
C Difference



Amir has 16 apples. Ron has none.
Amir gives Ron 9 apples.
Who has the most apples now?
Explain how you know.

Ron because he has 9 and Amir only has 7 left.
16 – 9 = 7

Look at the following objects.



Teddy works out these calculations.

15 – 4 = ____
15 – 11 = ____
11 – 4 = ____

What question could he have asked each time?

15 – 4 = 11 (Teddy has 15 bears. He eats 4. How many are left?)
15 – 11 = 4 (11 are yellow how many are purple?)
11 – 4 = 7 (How many more yellow bears are there?)

Related Facts

Notes and Guidance

Children explore addition and subtraction fact families for numbers within 20. They should work concretely and pictorially to find links between the addition and subtraction sentences.
They should recognize that addition and subtraction are inverse operations.
Children should begin to understand that addition is commutative but subtraction is not.

Mathematical Talk

What's the same and what's different?

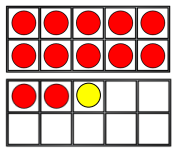
If we know 12 + 1 = 13, what else do we know?

Can you see any patterns?

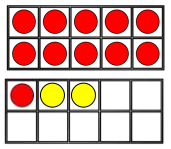
If we know that 15 – 3 = 12, why can't we say 3 – 15 = 12?

Varied Fluency

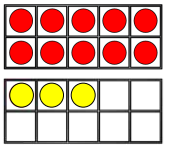
Complete the addition sentences.



12 + 1 = 13



11 + ___ = 13



___ + ___ = ___

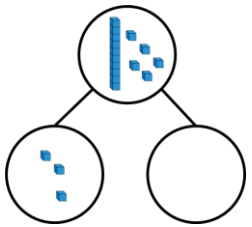
Can you write a subtraction sentence for each?

13 – 1 = 12

13 – ___ = ___

___ – ___ = ___

Complete:



15 – ___ = 3
15 – 3 = ___
3 + ___ = 15
___ + 3 = 15

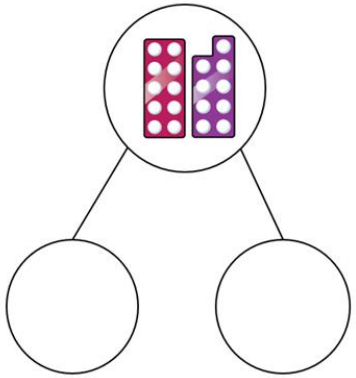
Complete and write addition and subtraction sentences for each bar model.

Can you use the numbers 8, 7 and 15 to make a bar model?
Can you write addition and subtraction sentences for this bar model?

Related Facts

Reasoning and Problem Solving

Use the cards to write as many addition and subtraction sentences as you can.

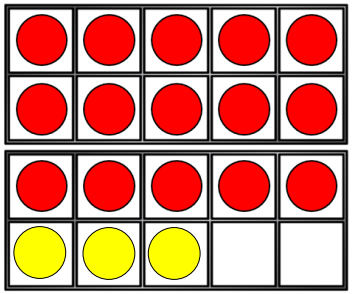


nine	add
ten	subtract
nineteen	is equal to

Children can use the words to create sentences

Possible answers:
Nine add ten is equal to nineteen.
Nine is equal to nineteen subtract ten.

Circle the addition and subtraction number sentences that match the ten frames.



$15 + 3 = 18$	$15 - 3 = 18$
$3 + 18 = 15$	$18 - 15 = 3$
$18 + 3 = 15$	$18 - 3 = 15$
$18 = 3 + 15$	$15 - 18 = 3$

$15 + 3 = 18$
$18 - 15 = 3$
$18 - 3 = 15$
$18 = 3 + 15$

Compare Number Sentences

Notes and Guidance

Children compare number sentences within 20 using inequality symbols.

Children may still need to use concrete manipulatives or draw images to help them compare calculations.
They should be encouraged to look at whether it is always necessary to have to work out the answers to calculations in order to compare them.

Mathematical Talk

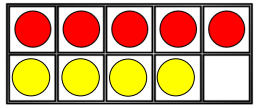
What do each of the symbols mean?

Do you always have to work out the answers to be able to compare calculations? Why?

Why might Tommy put 8 into the example below?
e.g. $7 + 1 = \_\_ - 2$

Varied Fluency

Which card completes the number sentence?

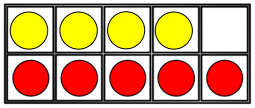


5 + 4

is more than

is less than

is equal to



4 + 5

Use <, > or = to compare the number sentences.

$3 + 8 \bigcirc 8 + 3$

$18 - 5 \bigcirc 18$

$12 + 4 \bigcirc 12 - 4$

Choose the correct digit card to make the number sentences correct.

$13 - 5 < 13 - \_\_$
$16 - 4 = \_\_ + 4$
$9 + \_\_ > 9 + 1$

Compare Number Sentences

Reasoning and Problem Solving

Alex

Any number less than 11 would make this correct.

$7 + 11 < 7 + \_\_$

Do you agree with Alex?

Explain why.

Alex is incorrect. She needs to use any number greater than 11

Whitney has 16 sweets and eats 7 of them.

Mo has 17 sweets and eats 8 of them.

Who has more sweets left?

Explain how you know.

Mo and Whitney have the same.
16 – 7 is equal to 17 – 8

Dexter is working out which symbol to use to compare the number sentences.

$14 - 5 \bigcirc 14 + 5$

The missing symbol must be = because all of the numbers are the same.

Do you agree with Dexter?
Explain why.

Dexter is incorrect because when you take 5 away from 14 the answer will be smaller than when you add 5 to 14 so the correct symbol should be <