Autumn Scheme of Learning

Year 1/2

#MathsEveryoneCan

2019-20

White Rose Maths

How to use the mixed-age SOL

In this document, you will find suggestions of how you may structure a progression in learning for a mixed-age class.

Firstly, we have created a yearly overview.

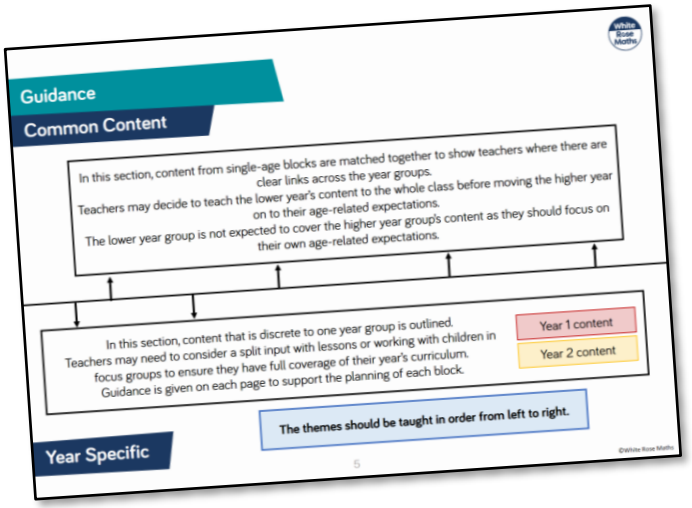
<table>
<tr><th></th><th>Week 1</th><th>Week 2</th><th>Week 3</th><th>Week 4</th><th>Week 5</th><th>Week 6</th><th>Week 7</th><th>Week 8</th><th>Week 9</th><th>Week 10</th><th>Week 11</th><th>Week 12</th></tr>
<tr><td>Autumn</td><td colspan="3">Number: Place Value
Y1 – Numbers to 20
Y2 – Numbers to 100</td><td colspan="5">Number: Addition and Subtraction
Year 1- Numbers within 20 (including recognising money)
Year 2- Numbers within 100 (including money)</td><td colspan="3">Number:
Year 1: Place Value to 50 and Multiplication
Year 2: Multiplication</td></tr>
<tr><td>Spring</td><td colspan="2">Number:
Year 1: Division & consolidation
Year 2: Division</td><td colspan="2">Year 1: Place Value to 100
Year 2: Statistics</td><td>Measurement: Length and Height</td><td colspan="2">Geometry:
Year 1: Shape and Consolidation
Year 2: Properties of Shape</td><td colspan="2">Number:
Year 1: Fractions and Consolidation
Year 2: Fractions</td><td>Consolidation</td></tr>
<tr><td>Summer</td><td>Geometry: Position and Direction</td><td colspan="2">Measurement: Time</td><td colspan="2">Problem solving and efficient methods</td><td colspan="3">Measurement:
Year 1: Weight and Volume
Year 2: Mass, Capacity and Temperature</td><td colspan="3">Consolidation and Investigations</td></tr>
</table>

Each term has 12 weeks of learning. We are aware that some terms are longer and shorter than others, so teachers may adapt the overview to fit their term dates.

The overview shows how the content has been matched up over the year to support teachers in teaching similar concepts to both year groups. Where this is not possible, it is clearly indicated on the overview with 2 separate blocks.

For each block of learning, we have grouped the small steps into themes that have similar content. Within these themes, we list the corresponding small steps from one or both year groups. Teachers can then use the single-age schemes to access the guidance on each small step listed within each theme.

The themes are organised into common content (above the line) and year specific content (below the line). Moving from left to right, the arrows on the line suggest the order to teach the themes.



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How to use the mixed-age SOL

Here is an example of one of the themes from the Year 1/2 mixed-age guidance.

Subtraction

Year 1 (Aut B2, Spr B1)
- How many left? (1)
- How many left? (2)
- Counting back
- Subtraction - not crossing 10
- Subtraction - crossing 10 (1)
- Subtraction - crossing 10 (2)

Year 2 (Aut B2, B3)
- Subtract 1-digit from 2-digits
- Subtract with 2-digits (1)
- Subtract with 2-digits (2)
- Find change - money

In order to create a more coherent journey for mixed-age classes, we have re-ordered some of the single-age steps and combined some blocks of learning e.g. Money is covered within Addition and Subtraction.

The bullet points are the names of the small steps from the single-age SOL. We have referenced where the steps are from at the top of each theme e.g. Aut B2 means Autumn term, Block 2. Teachers will need to access both of the single-age SOLs from our website together with this mixed-age guidance in order to plan their learning.

Points to consider

- Use the mixed-age schemes to see where similar skills from both year groups can be taught together. Learning can then be differentiated through the questions on the single-age small steps so both year groups are focusing on their year group content.
- When there is year group specific content, consider teaching in split inputs to classes. This will depend on support in class and may need to be done through focus groups .
- On each of the block overview pages, we have described the key learning in each block and have given suggestions as to how the themes could be approached for each year group.
- We are fully aware that every class is different and the logistics of mixed-age classes can be tricky. We hope that our mixed-age SOL can help teachers to start to draw learning together.

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Guidance

Common Content

In this section, content from single-age blocks are matched together to show teachers where there are clear links across the year groups.
Teachers may decide to teach the lower year's content to the whole class before moving the higher year on to their age-related expectations.
The lower year group is not expected to cover the higher year group's content as they should focus on their own age-related expectations.

In this section, content that is discrete to one year group is outlined.
Teachers may need to consider a split input with lessons or working with children in focus groups to ensure they have full coverage of their year's curriculum.
Guidance is given on each page to support the planning of each block.

Year 1 content

Year 2 content

Year Specific

The themes should be taught in order from left to right.

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	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Number: Place Value Y1 – Numbers to 20 Y2 – Numbers to 100			Number: Addition and Subtraction Year 1- Numbers within 20 (including recognising money) Year 2- Numbers within 100 (including money)						Number: Year 1: Place Value to 50 and Multiplication Year 2: Multiplication		
Spring	Number: Year 1: Division & consolidation Year 2: Division			Year 1: Place Value to 100 Year 2: Statistics	Measurement: Length and Height	Geometry: Year 1: Shape and Consolidation Year 2: Properties of Shape			Number: Year 1: Fractions and Consolidation Year 2: Fractions			Consolidation
Summer	Geometry: Position and Direction	Measurement: Time		Year 1: Place Value recap Year 2:Problem solving		Measurement: Year 1: Weight and Volume Year 2: Mass, Capacity and Temperature			Year 1: Four Operations recap Year 2: Consolidation and Investigations			Consolidation

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Addition and Subtraction (1)

Common Content

Money

Year 1 (Sum B5)
- Recognising coins
- Recognising notes

Year 2 (Aut B3)
- Count money - notes and coins
- Select money

Fact families and number bonds

Year 1 (Aut B2, Spr B1)
- Fact families - addition facts
- Find number bonds within 10
- Systematic methods within 10
- Number bonds to 10
- Compare number bonds
- Fact families - the 8 facts
- Find and make number bonds
- Related facts

Year 2 (Aut B2, B3)
- Fact families - addition and subtraction bonds to 20
- Check calculations
- Bonds to 100 (tens)
- Bonds to 100 (tens and ones)
- Make the same amount- money

Addition - adding more

Year 1 (Aut B2, Spr B1)
- Addition - adding more
- Add by counting on
- Add by making 10

Year 2 (Aut B2, B3)
- Add a 2-digit and 1-digit - crossing 10
- Add two 2-digit numbers - not crossing 10
- Add two 2 digit numbers - crossing 10
- Add three 1-digit numbers
- Find the total - money

Year Specific

Part-whole model

Year 1 (Aut B2)
- Part-whole model
- Addition symbol
- Addition - adding together
- Finding a part
- Subtraction - breaking apart

Add and subtract

Year 2 (Aut B2)
- Add and subtract 1s
- 10 more and 10 less
- Add and subtract 10s

In this block, we have incorporated some of the money blocks in order to provide better coverage of the steps for both year groups. Other money steps will be covered in the multiplication block. Children start by recognising coins and Year 2 then add and subtract using money throughout the block.

Year 1 are introduced to the part-whole model for addition and subtraction and use this to support fact families and number bonds. Year 2 can recap this learning before moving on to number bonds to 100

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Addition and Subtraction (2)

Common Content

Subtraction

Year 1 (Aut B2, Spr B1)
- How many left? (1)
- How many left? (2)
- Counting back
- Subtraction - not crossing 10
- Subtraction - crossing 10 (1)
- Subtraction - crossing 10 (2)

Year 2 (Aut B2, B3)
- Subtract 1-digit from 2-digits
- Subtract with 2-digits (1)
- Subtract with 2-digits (2)
- Find change - money

Difference

Year 1 (Aut B2)
- Subtraction - finding the difference

Year 2 (Aut B3)
- Find the difference - money

Compare number sentences

Year 1 (Aut B2, Spr B1)
- Compare statements (1)
- Compare statements (2)
- Compare number sentences

Year 2 (Aut B2, B3)
- Compare number sentences
- Compare money

Children are introduced to different structures of subtraction throughout this block. Within the part-whole model, they see subtraction as partitioning before looking at take-away and difference.

Using their addition and subtraction skills, both year groups recap the use of < and > in order to compare number sentences. Year 2 then move on to 2-step problems within the context of money. Year 1 could also be encouraged to explore addition and subtraction within money practically through games and role-play.

Problem Solving

Year 2 (Aut B3)
- 2-step problems - money

Year Specific

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Addition & Subtraction

Theme 1 – Money

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Recognising Coins

Notes and Guidance

Children will recognise and know the value of different denominations of coins.
Children will use their knowledge of place value to match coins with equivalent values. For example, ten 1 pence coins is equivalent to one 10 pence coin. This could be linked with the concept of exchanging.
Teachers could use coins to support this activity (or pictures where appropriate).

Mathematical Talk

How have you organised the coins?

What is the value of each coin? How do you know?

How many 1 pence coins will you need to make 2 p? 5 p? 10 p? 20 p? 50 p? 1 pound?

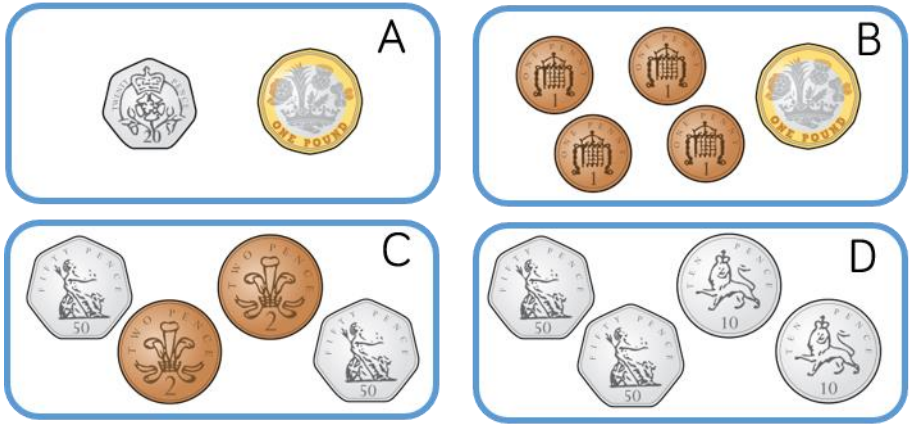
How many 1 pound coins will you need to make 2 pounds?

Varied Fluency

- Organise the coins on your table into pence and pounds.
Can you name each coin?

- Write down the value of each coin.

- Match the cards with equal values.



Recognising Coins

Reasoning and Problem Solving

Dora says:

Do you agree with Dora?

Justify your answer.

Dora is incorrect.

A 50 p coin isn't round.
A 20 p coin isn't round.
A £1 coin isn't round.

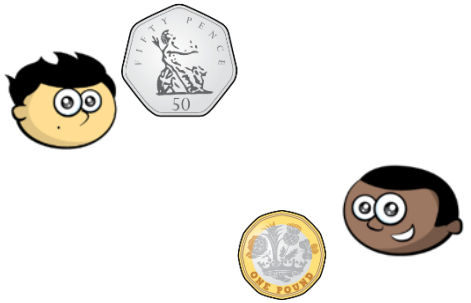
Which is the odd one out?

20 p | 8 p | 2 p | 10 p

Why?

8 p is the odd one out because we do not have an 8 p coin.

The tooth fairy left some money for two children.



Jack has 50 pence. Mo has one pound.

Jack thinks he has more money because his coin is physically bigger.

Explain why Jack is wrong.

Jack is wrong because although the 50 pence coin is physically bigger it only has a value of 50 pence, but the pound coin has a value of 100 pence.

Recognising Notes

Notes and Guidance

Once children are able to identify and recognise coins they need to be able to recognise notes.

Children use their understanding of place value to see that one note can represent many pounds, for example, a ten pound note could be 10 pound coins or 3 two pound coins and 4 one pound coins. Children also need to be aware that one note may be worth many times the value of another note.

Mathematical Talk

Can you name each note?

What is the same about each note?

What is different about each note?

How many ___ pound notes are equivalent to a ___ pound note?

Varied Fluency

How many of each note can you see?

There are _____ 5 pound notes.
There are _____ 10 pound notes.
There are _____ 20 pound notes.

What is the value of each note?

= ☐ pounds

= ☐ pounds

= ☐ pounds

Fill in the blanks.

One = ☐

One = ☐

Recognising Notes

Reasoning and Problem Solving

Teddy is given one for Christmas.

Eva is given two

Teddy

I got more than you did because my number is bigger.

I got more than you did because I got two notes.

Eva

Who is correct?

Explain your reasoning.

Both Teddy and Eva are wrong because they both have £10.

Eva has two £5 notes, which makes £10, and Teddy has a £10 note.

Jack, Rosie and Amir each have some money in their pockets.
Jack and Amir both have coins and Rosie has a note.

I have more money than Rosie.

Amir

I have less money than Rosie.

Jack

What note could Rosie have?

Rosie could have a £5 note.
She could not have a £10 or a £20 note because they are larger than Amir's amount.

Always, sometimes, never

Money in notes is worth more than money in coins.

Sometimes - if you have £6 in coins it is worth more than a £5 note.
However you could also have less than £5 in coins.

Count Money – Notes & Coins

Notes and Guidance

In this step, children will build on counting by bringing pounds and pence together.

Decimal notation is not used until KS2 therefore children will write the total using 'and' e.g. £5 and 30 p rather than £5.30

Children will not count across £1. They will count the pounds and pence separately before putting them together.

Mathematical Talk

How did you work out the total amount of money?

What strategy did you use to count the money when there is pounds and pence?

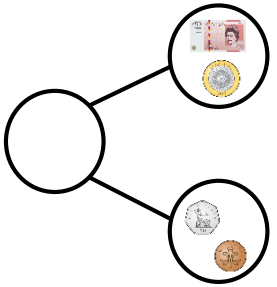
Explain what to do when the pounds and pence are mixed up.

Varied Fluency

How much money is there altogether?

There is £____ and ____p.

Complete the part-whole model.



What's the same and what's different about the parts?

Fill in the gaps to make the statements correct.

- £10 + £5 + 50 p = £_____ and _____p
- £20 + £2 + 10 p + 10 p + 2 p = £_____ and _____p
- £5 + £___ + 50 p + 20 p + 20 p + 1 p = £10 and ____p

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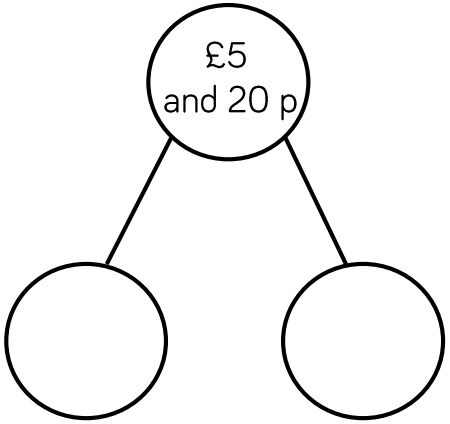
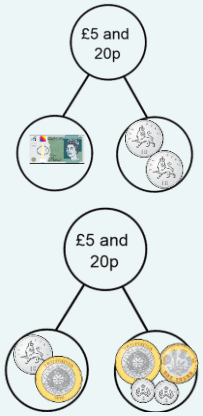
Count Money – Notes & Coins

Reasoning and Problem Solving

How many ways can you complete the part-whole model by drawing money?



Example answers:



Mo has the following coins.

He thinks he has 51 p.

Explain his mistake.

Mo thinks the 5 p is a 50 p coin. He has 6 p. Alternatively, he has combined the 5 and 1 from each coin.

Here are some coins and a note.

Amir says, "There is 10 p".

Dexter says, "There is £10".

Are either of them correct?

Explain why.

No, Amir and Dexter have taken the digits 2, 2, 5 and 1 and added them together.

The coins are a mix of pounds and pence so need to be counted separately.

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Select Money

Notes and Guidance

Children select coins to make an amount, from a set of coins given to them. They will use these practically, draw them and write the abstract amounts.
They will continue to use both pounds and pence to embed previous learning.
Children are continuing to work on recognising money by selecting the correct coins or notes from a wide range.

Mathematical Talk

How do you know you have made 56 p?
Is your answer the same as your partner?
Can you find any other ways to make this amount?

Does it matter if you say pence or pounds first?

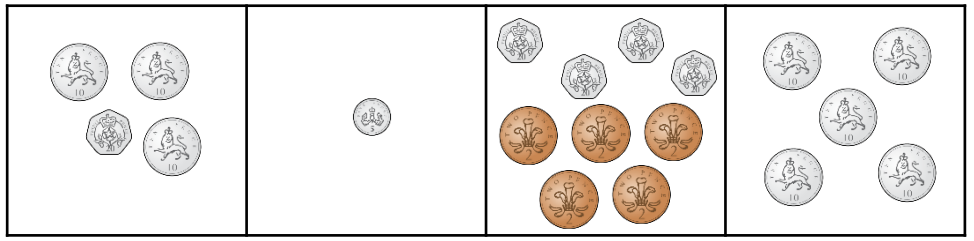
Does this change the total?

Can you show this amount in a different way?

Varied Fluency

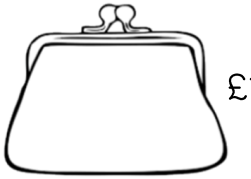
- Circle 56 p.

- Which does **not** show 50 p?



- Draw money on the purses to match the amounts.

£21 and 32 p



£13 and 40 p

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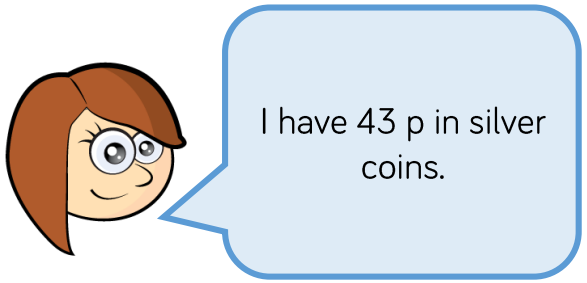
Select Money

Reasoning and Problem Solving

Rosie says,



Do you agree?

Explain why.

No, because 3 pence can only be made with copper coins.

Annie and Ron both claim to have 90 p.

Annie has 3 coins and Ron has 4 coins.

Could they be correct?

Which coins could they have?

Yes, they can because:
Annie = 50 p, 20 p, 20 p.
Ron = 50 p, 20 p, 10 p, 10 p.

Use the money to fill the purses.

You can only use each coin or note once.

Cross them out once you have used them.

£10 and 15 p

£5 and 51 p

Example answer:

£10 and 15 p

£5 and 51 p

Circle the odd one out.

23 p = 20 p, 2 p, 1 p
25 p = 20 p, 5 p
28 p = 20 p, 8 p

Explain your answer.

28 p = 20 p, 8 p is because if you are using coins there is not an 8 p coin. Children may give other answers.

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Addition & Subtraction

Theme 2 – Part-whole model

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Part-whole Model

Notes and Guidance

Children need to understand that a number can be partitioned into two or more parts. This will help them with number bonds and addition.
They will be introduced to the part-whole model to show this concept clearly, and should get used to seeing it in different orientations.
Children should use and understand the language part, part, whole.

Mathematical Talk

What does whole mean?

What does part mean?

How can we represent the whole/parts?

Are the parts smaller or larger the more you partition them? Why?

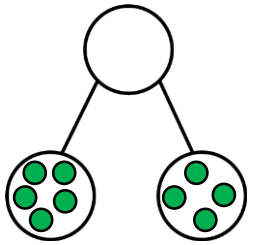
Can zero be a part?

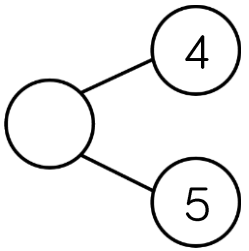
Can the parts be swapped around?

Can the whole be swapped with a part?

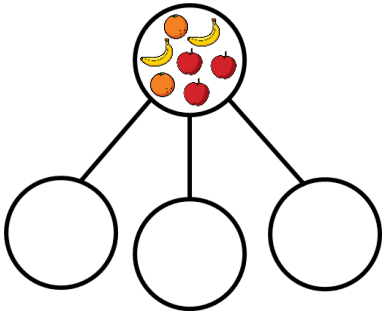
Varied Fluency

Complete the part-whole models by drawing counters and then writing the numerals.





Here are seven pieces of fruit.



Put the fruit into a part-whole model.
Complete the sentences.
_____ is the whole.
_____ is a part, _____ is a part and _____ is a part.

Draw the part-whole model that represents the stem sentences:

- A part is 4
- A part is 3
- The whole is 7

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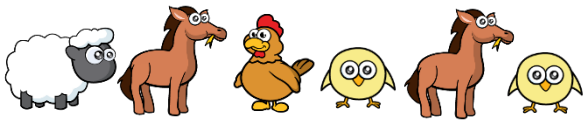
Part-whole Model

Reasoning and Problem Solving

There are 6 animals.  How many different ways can you sort the animals? Complete a part-whole model for each way. Can you partition the animals into more than 2 groups?	Various answers. E.g. brown & not brown 4 legs & 2 legs Multiple groups could be the type of animal. Part-whole models should accurately represent children's sorting.
4 is the whole. How many **different** part-whole models can you draw to show this? Use different numbers for the parts every time. Are any the same? Why?	4 and 0, 0 and 4 1 and 3, 3 and 1 2 and 2 Children should recognise 4 and 0 and 0 and 4 being the same etc.

Work in groups of up to 8 children. Can you split yourselves into different groups? Think of different ways to group yourselves: hair colour, eye colour, gender, shoe size etc. Complete a part-whole model for each way. Can you partition into more than 2 groups?	Children may split themselves into groups in many different ways. E.g. hair colour, month of birth, shoe size, gender etc. Part-whole models should accurately represent children's sorting.

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The Addition Symbol

Notes and Guidance

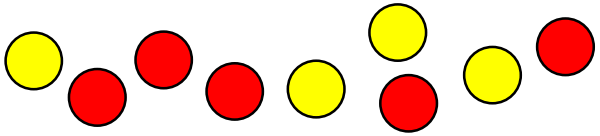
Children are introduced to the addition symbol (+) for the first time. They combine this with the 'equal to' symbol (=) to create their first number sentences e.g. $3 + 2 = 5$
At this stage, children focus on a specific order to the number sentence ($a + b = c$). They focus on the language associated with this number sentence. For example, 7 apples plus 3 apples is equal to 10 apples. First, then, now stories and bar models may help children understand the number sentences.

Mathematical Talk

How many were there at the start?
Then how many more were added?
What is the total?
What does the = mean?
Which number tells us how many we had to start?
Which number shows what has been added?
Which number represents the total?
How many green cubes could we use?
How many yellow cubes could we use?
Which part do the cubes represent?

Varied Fluency

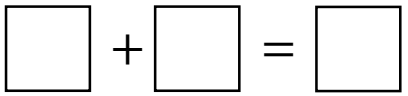
Here are some counters.

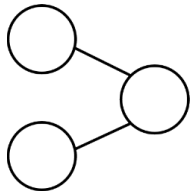


Group the counters by colour.
Fill in the gaps in the sentence and say it out loud.

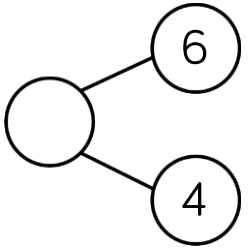
_____ red counters plus _____ yellow counters is equal to _____ counters.

Complete the part-whole model and the number sentence.





Use cubes to solve the following calculations.



$5 + 3 =$ ☐

$8 + 1 =$ ☐

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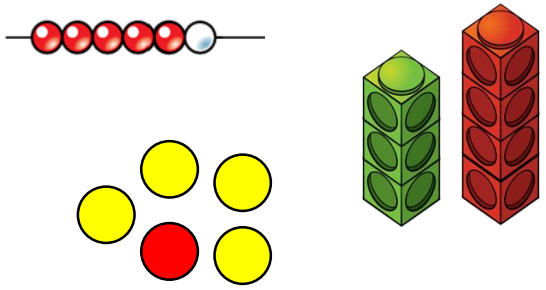
The Addition Symbol

Reasoning and Problem Solving



_____ + _____ = 6

Which of the images could help to complete the number sentence? Explain why.

Can you think of a number sentence for each of the other two images?

The bead string as there are 6 beads in total, 5 red and 1 white, so
5 + 1 = 6 or
1 + 5 = 6

The cubes could represent
3 + 4 = 7 or
4 + 3 = 7

The counters could represent
4 + 1 = 5 or
1 + 4 = 5

Using the numbers 0 – 9, how many ways can you fill in the boxes to make the calculation correct?
You can only use each number once.

□ + □ = □

How many different calculations are there?

What do you notice?

Examples may include:
5 + 1 = 6
3 + 4 = 7
There are 32 in total.

Children should recognise that the parts can be swapped to create a difference number sentence. There should be a discussion as to why we haven't/can't include 0 in our calculations.

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Add Together

Notes and Guidance

Children will use a part-whole model to understand the concept of addition. They should be accurately using the '+' and '=' symbols.

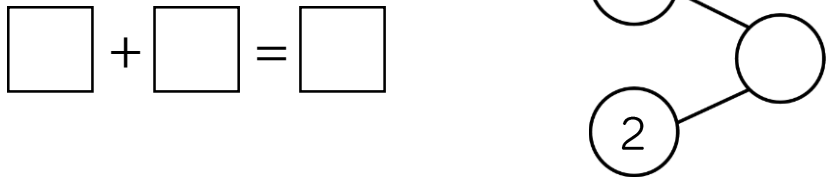
Children should also become familiar with language related to addition such as 'total' and 'altogether'.

Mathematical Talk

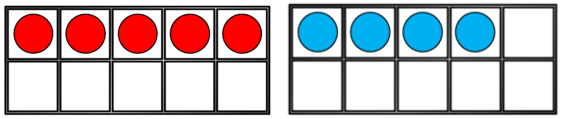
What does each circle represent on a part-whole model?
Which of the numbers are parts?
Which of the numbers is the whole?
What else can we use to represent the cars? Can we only use counters and ten frames?
How many did you have to start with? Then what happened?
How many do you have now?
How does the ten frame help us when finding the total? Did we need two ten frames for 5 and 4? Why?
What number sentence would represent this?

Varied Fluency

- If 2 is a part and 5 is a part, what is the whole?



- There are 5 red cars and 4 blue cars. How many cars are there altogether?



□ + □ = □

□ = □ + □

- Complete the table to represent the owls.

Ten Frame	Part Whole Model
Sentences	Make your own story
___ is a part. ___ is a part. The whole is ___ .	

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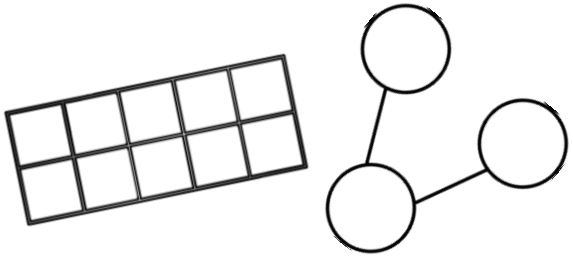
Add Together

Reasoning and Problem Solving

There are 8 cubes.
Some are red and some are yellow.

How many different ways can you make a total of 8?



You should show your working out on a ten frame and a part-whole model.

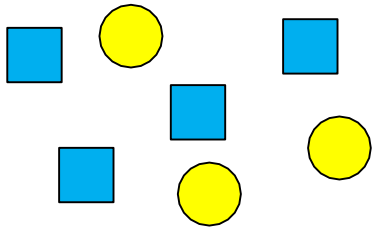
There could be:
7 red and 1 yellow,
6 red and 2 yellow,
5 red and 3 yellow,
4 red and 3 yellow,
3 red and 5 yellow,
2 red and 6 yellow
or 1 red and 7 yellow.

Children could use cubes/ten frame to show that this is incorrect as 7 and 3 would make 10 not 9

There are 9 sweets altogether.
3 have a red wrapper and 7 have a blue wrapper.
Is this correct?

Explain how you know.

Which sentence is correct?



A
5 is a part, 2 is a part and 7 is the whole.

B
4 is a part, 3 is a part and the whole is 8

C
4 is a part, 3 is a part and 7 is the whole.

What mistake has been made in the incorrect sentences?

A is wrong because the parts are not right.
B is wrong because the whole is not 8
C is correct.

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Finding a Part

Notes and Guidance

Children should apply their understanding of number bonds to solve missing number problems. Building from counting on, children should start from the given part and count on to the whole, to find the missing part.

Children should also be exposed to problems with one part and the whole being the same so they understand the role of zero.

Mathematical Talk

Do you know the value of both parts?

Do you know the value of the whole?

How can we count on to find the missing part?

What number sentence would represent what we currently have/know?

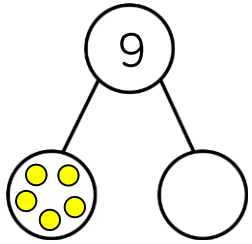
Where will the numbers from the word problem go in the part-whole model?

Where are we counting on from? How do you know?

Where are we counting to? How do you know?

Varied Fluency

- Complete the part-whole model and use it to fill in the number sentences.



□ + □ = □

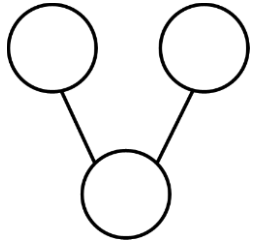
□ = □ + □

5 is a part,
___ is a part,
9 is the whole.

- There are seven cars in total. Seven of them are green. How many of them are yellow?

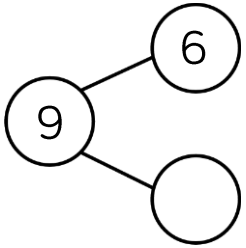
□ + □ = □

□ = □ + □



7 is a part,
___ is a part,
7 is the whole.

- Write your own story to complete the part-whole model.



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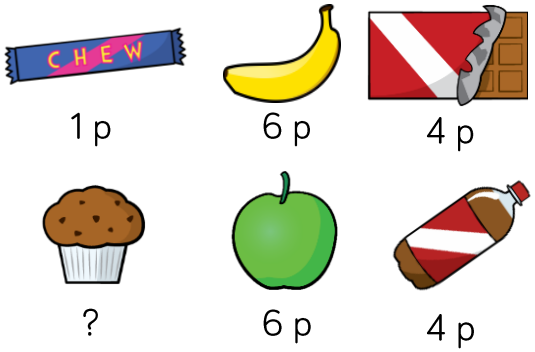
Finding a Part

Reasoning and Problem Solving



Eva spends 10p on a chocolate bar and something else. What else could she have bought? Explain how you know.

Jack spent 9p on a banana and a muffin. How much is a muffin? Explain how you know.

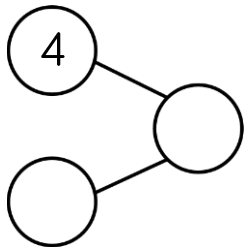
Rosie spent 6p on a chocolate bar and something for her brother. What did she buy for her brother? Explain how you know.

Eva could buy a banana or an apple as they are both 6 p and
4 p + 6 p = 10 p

A muffin costs 3 p because
6 p + 3 p = 9 p

Rosie bought her brother two chew bars because
4 p + 2 p = 6 p
and 1 chew bar is 1 p and nothing else is 2 p

Using the digits 0 – 9, how many ways can you complete the part-whole model? One of the parts always has to be 4



You can only use each digit once.

Explain why you can't use 0

What other digits can't you use and why?

It could be:
- 4, 1 and 5
- 4, 2 and 6
- 4, 3 and 7
- 4, 5 and 9

You can't use 0 because the whole would have to be 4 and then it would be repeated.
You can't use 8 because if it was a part, the whole would be too big and if it was the whole we would need another 4

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Subtraction – Breaking Apart

Notes and Guidance

Children continue using the subtraction symbol. Building on their understanding of finding a part, they are introduced to subtraction by partitioning.

Children break apart a number into two parts using concrete and pictorial representations to support.

Mathematical Talk

What is the whole? What are the parts?

If ___ is the whole, and ___ is a part, what is the other part?

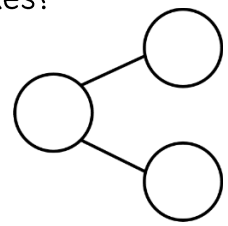
How can I use the array of party hats to convince someone else that my answer is right?

How many ways can I partition 8 into parts? Use two hoops and 8 counters to support.

Varied Fluency

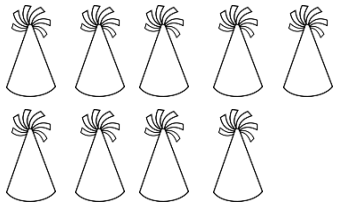
- How many ice creams do not have flakes?

6 – 2 = ___

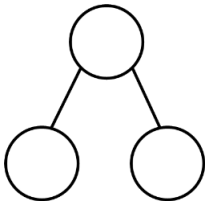


There are ___ ice creams that do not have flakes.

- There are 9 party hats altogether. 4 of them are red. The rest are blue. How many are blue?

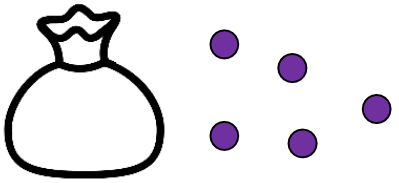


___ = 9 – 4



There are ___ blue party hats.

- In total there are 8 counters.
How many counters are there in the bag?
Show this in a part-whole model and as a calculation.



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Subtraction – Breaking Apart

Reasoning and Problem Solving

Think of two questions to ask your friend about the image.

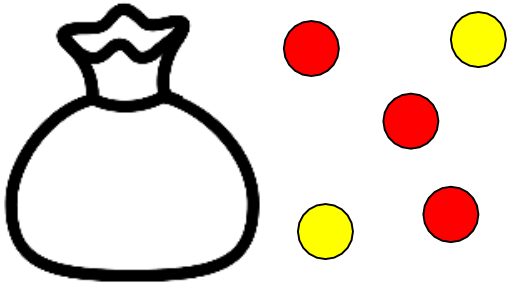
Represent your questions and answers in a part-whole model and as a number sentence.

Examples:
There are 9 sheep in total. 5 of them are outside the barn. How many sheep are inside the barn?

There are 9 sheep in total. 4 of them are inside the barn. How many sheep are outside the barn?

Etc.

There are no more than 10 counters in total.



How many counters could be in the bag?

Why can't it be six?

There could be 5, 4, 3, 2, 1 or 0

There can't be six because then there would be 11 counters in total, which is more than 10

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Addition & Subtraction

Theme 3 – Add and subtract

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Add and Subtract 1s

Notes and Guidance

Children should start seeing the pattern when we add and subtract 1 and comment upon what happens.

This is the step before finding ten more than or ten less than, as bridging beyond a 10 should not be attempted yet.

The pattern should be highlighted also by adding 2 (by adding another one) and then adding 3

Mathematical Talk

What happens when we add 2?

What is the link between adding 1 and adding 2?

What about if we want to add 3?

How can a bead string help when we are adding 1, 2, 3 etc.?

Where will be the best place to start on each number track? Why?

Varied Fluency

- Create sentences based on the picture.

Example

There are 4 children playing in a park.
One more child joins them so there will be 5 children playing together.

- Continue the pattern

$22 = 29 - 7$
$22 = 28 - 6$

Can you create an addition pattern by adding in ones and starting at the number 13?

- Continue the number tracks below.

31			34		

		45			48

				67	

	13				

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Add and Subtract 1s

Reasoning and Problem Solving

True or False?

These four calculations have the same answer.

$1 + 4 + 2$ $\quad$ $4 + 2 + 1$

$2 + 4 + 1$ $\quad$ $4 + 1 + 2$

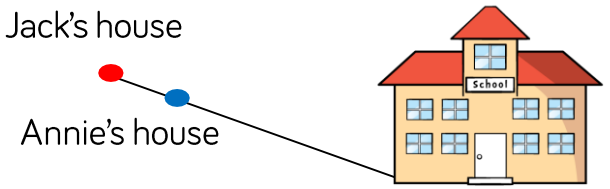
True, because they all equal 7 and addition is commutative.

These four calculations have the same answer.

$7 - 3 - 2$ $\quad$ $2 - 3 - 7$

$3 - 2 - 7$ $\quad$ $7 - 2 - 3$

False, because subtraction isn't commutative.



Jack lives 5 km from school.
Annie lives 4 km from school in the same direction.

What is the distance between Jack and Annie's houses?

1 km

After travelling to and from school, Jack thinks that he will walk 1 km more than Annie. Is he correct?
Explain your answer.

No, he will walk 2 km further. 1 km on the way to school and 1 km on the way home.

What will be the difference in distance walked after 2 school days?

4 km

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10 More and 10 Less

Notes and Guidance

Teaching needs to focus on the importance of the tens digit.
Using a 100 square, explore with the children what happens to the numbers in the columns.
Draw attention to the idea that the tens digit changes while the ones digit remains the same.
Children will need to see how the number changes with concrete materials before moving onto more abstract ideas.

Mathematical Talk

What's the same? What's different?

Will you start with 35 or 55? Why?

When you look at a hundred square, what do you notice about the numbers that are ten more and ten less than 27?

Which direction will your finger move on a hundred square if you are finding ten more/ten less?

Varied Fluency

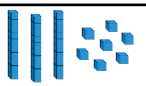
Continue the number tracks below.

10	20	30						

			35	45	55			

Using a 100 square, circle the number that is 10 more than 27
Circle the number that is 10 less than 27
Repeat in different colours for different numbers.
What do you notice?

Using concrete materials, complete the missing boxes.

10 less	Number	10 more
2	12	22
		
	37	

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10 More and 10 Less

Reasoning and Problem Solving

SALE

15 p

22 p

35 p

68 p

The cost of each piece of fruit is reduced by 10 p.

What are the new prices?

Red Apple 5 p

Green Apple 12 p

Banana 25 p

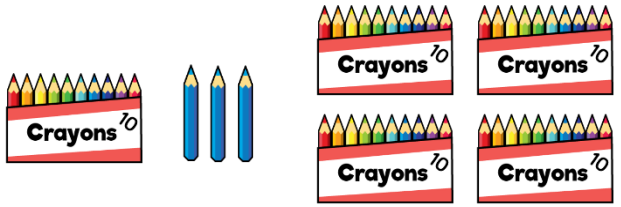
Lemon 58 p

Mo says,

I know that 10 more than 72 is 82 because I only have to look at the tens digit.

Is he correct?
Explain your reasoning.

Yes, because when you add ten you aren't adding ones.



Class 3 gives one of their full packets of crayons away.

How many crayons do they have left?

Explain your reasoning.

43

They will have four full packs left which is four tens, and three crayon which represents three ones.

Rosie is counting backwards in 10s.
She says forty-nine, thirty-nine, twenty-nine and then stops.
What numbers comes next and why?

19 because you take one ten away from 29, then 9

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Add and Subtract 10s

Notes and Guidance

Children should make use of place value to add and subtract 10s from a given number within 100
The key teaching point again is the importance of the tens digit within the given numbers, and children should be encouraged to see the relationship.

For example $64 + 20 = 84$

Mathematical Talk

What is the number sentence that will help us to find the first missing number in the number track?

What is the same/different about the next number sentence?

Why is there a blank ones box?

Which column changes?

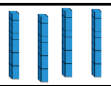
Which column stays the same?

Varied Fluency

Continue the number track by adding 20 each time.

23				

Use the place value charts and concrete materials to complete the calculations.

Tens	Ones
	

$$\begin{array}{r} 2\ 3 \\ +\ 4\ 0 \\ \hline \\ \hline \end{array}$$

Tens	Ones

$$\begin{array}{r} 5\ 6 \\ -\ 3\ 0 \\ \hline \\ \hline \end{array}$$

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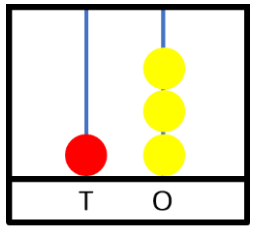
Add and Subtract 10s

Reasoning and Problem Solving



Tommy has three spare red beads.

What numbers could he make?
Explain your answer.

23

33

43

He doesn't have to use all of the beads.

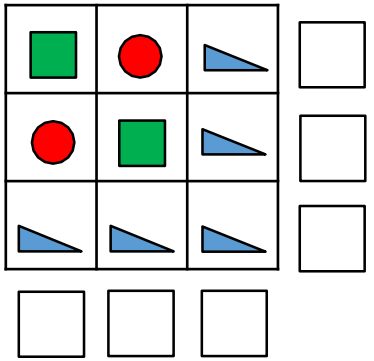
Here are Class 2's crayons.

They are given a new box of 10 each day for a week.

How many crayons do they have at the end of the week?

Discussion could be had about whether it's a full week or a school week.

Answers would be 96 or 76 respectively.



Circles represent 20
Triangles represent 10
Squares represent 50

What is the value of each row and column?

Rows

(top to bottom)

80

80

30

Columns

(left to right)

80

80

30

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Addition & Subtraction

Theme 4 – Fact families and number bonds

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Fact Families – Addition Facts

Notes and Guidance

Children build on initial number sentences by looking at addition fact families. They can see that the order of an addition sentence can be varied, and they begin to discover that addition is commutative.

E.g. $3 + 2 = 5$ $2 + 3 = 5$

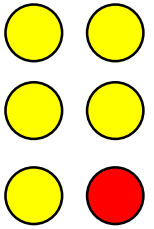
$5 = 3 + 2$ $5 = 2 + 3$

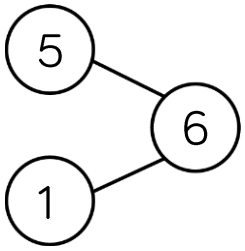
Mathematical Talk

Which number(s) represent a part?
Which number represents the whole?
Is the equals sign always at the end of a number sentence?
What's the same/different about the four addition sentences?
If two of the numbers in the part-whole model are the same, can we still write four addition sentences? Prove it.
Can we make another addition calculation using the same 3 numbers?
Can the parts change place? Can the whole change place? Why?

Varied Fluency

- Use the counters and the part-whole model to fill in the missing numbers.





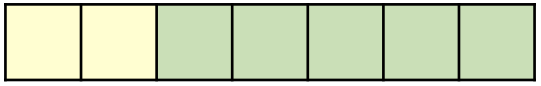
$1 + __ = 6$

$__ + 1 = 6$

$__ = __ + 1$

$6 = __ + __$

- Complete the number sentences.



$__ + __ = 7$ $7 = __ + __$

$__ + __ = 7$ $7 = __ + __$

- Use the number cards to make 4 addition sentences.

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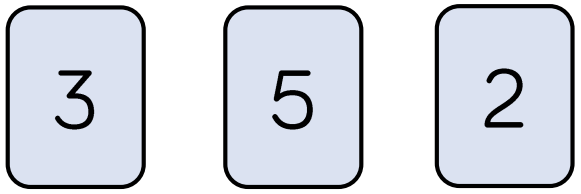
Fact Families – Addition Facts

Reasoning and Problem Solving

Eva has 3 number cards.



She has written two number sentences.

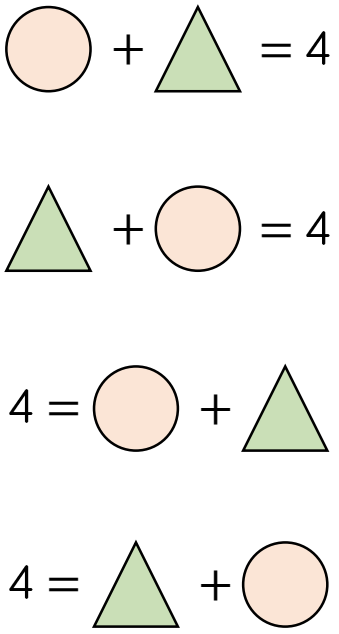
$3 + 5 = 2$ $3 = 5 + 2$

Explain what Eva has done wrong.

Correct her number sentences and complete the fact families.

Eva has placed the numbers in the order she was given them, rather than moving them to make the number sentence correct.

It should be:
$3 + 2 = 5$
$2 + 3 = 5$
$5 = 3 + 2$
$5 = 2 + 3$



What could the circle and the triangle be worth?

Possible answers:

Circle: 2
Triangle: 2

Circle: 3
Triangle: 1

Circle: 1
Triangle: 3

Circle: 0
Triangle: 4

Circle: 4
Triangle: 0

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Number Bonds within 10

Notes and Guidance

Children combine their knowledge of the part-whole model and addition facts to explore number bonds within 10
Starting with the whole, children break numbers into parts and explore how many different ways a number can be partitioned.

E.g. $5 = 3 + 2$

$5 = 4 + 1$

Mathematical Talk

What is the whole?

What are the parts?

Does the whole always stay the same?

How can we partition the whole?

Do the parts stay the same or change?

If 8 is the whole, what could the parts be?

What number sentence would represent the parts we have partitioned the whole into?

Varied Fluency

- Here are 5 cubes.

Break them apart in different ways to find all the number bonds to 5
One has been done for you.

$5 = 3 + 2$

- Use seven double sided counters.

How many different ways to make 7 can you find?
Record your findings in number sentences.

- If 9 is the whole, what could the parts be?

Show your findings in part-whole models.
Can you write an addition sentence for each part-whole model?

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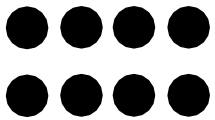
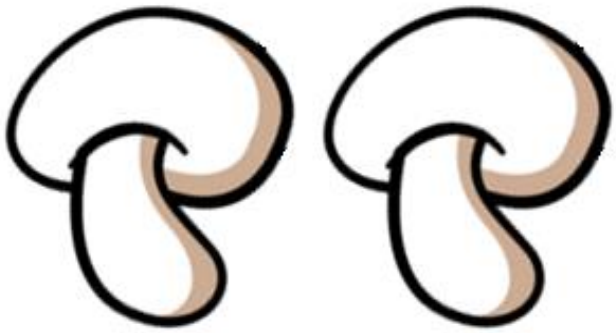
Number Bonds within 10

Reasoning and Problem Solving

All the dots have fallen off 2 toadstools.





How many different ways can you put them back on?

There are 9 different ways altogether.
8 and 0,
0 and 8,
7 and 1,
1 and 7,
6 and 2,
2 and 6,
5 and 3,
3 and 5
4 and 4

Always, Sometimes, Never

The greater the number, the more number bonds it has.

Sometimes.
Children can prove this by comparing the number bonds for a few numbers. For example, 6 has more bonds than 5, but 7 has an equal number of bonds to 5

Which number bond is the odd one out?

$3 + 4$ $5 + 2$ $6 + 1$ $3 + 5$

Explain your answer.

$3 + 5$ is the odd one out because this is a bond to 8 and the others are number bonds to 7

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Systematic Number Bonds

Notes and Guidance

Children apply their partitioning skills to work systematically starting with the whole. E.g.

$7 + 0 = 7$
$6 + 1 = 7$
$5 + 2 = 7$
$4 + 3 = 7$

This is supported through the use of equipment, for example cubes, bead strings, double sided counters.

Mathematical Talk

What two numbers can be added together to make _____?

Write the number sentence to represent this number bond.

Are there any more ways to make this number bond?

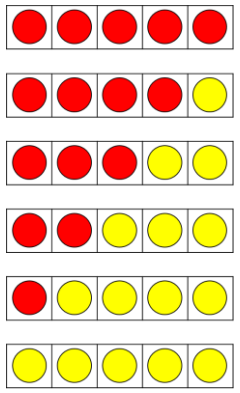
Can you see a pattern in the numbers?

What is happening to the parts each time?

Does the amount of number bonds change as the number gets bigger or smaller?

Varied Fluency

- Complete the number sentences.



$5 = 5 + 0$

$5 = 4 + 1$

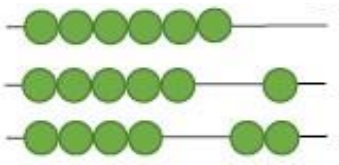
$_ = _ + _$

$_ = _ + _$

$_ = _ + _$

$_ = _ + _$

- Complete the next bead strings in the sequence.



$6 = 6 + 0$

$6 = 5 + 1$

$6 = 4 + 2$

- Can you use a ten frame to show all the number bonds to 7? Remember to be systematic.

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Systematic Number Bonds

Reasoning and Problem Solving

Jack found the following number bonds to 8

3 + 5 0 + 8

1 + 7 4 + 4

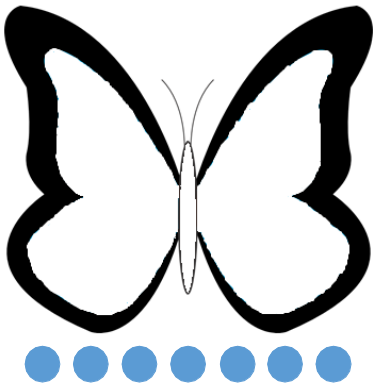
2 + 6

What order would Jack have found them in if he'd have worked systematically?

There are 9 different ways altogether.
8 and 0
0 and 8
7 and 1
1 and 7
6 and 2
2 and 6
5 and 3
3 and 5
4 and 4

A butterfly's spots have fallen off.
How many different ways can you put the spots back on?

Remember to be systematic.



Possible answers:

0 + 7 = 7

1 + 6 = 7

2 + 5 = 7

3 + 4 = 7

Children may choose to use:
7 + 0 = 7
6 + 1 = 7
5 + 2 = 7
4 + 3 = 7

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Number Bonds to 10

Notes and Guidance

Focusing on the number 10, children use a variety of representations to explore number bonds to 10 systematically e.g. ten frames, bead strings, fingers.

The children should also see the number sentence alongside the representation to help further develop their conceptual understanding.

Mathematical Talk

What number have you started with?

How many more do I need to make 10?

How many number bonds can I make if 10 is the whole?

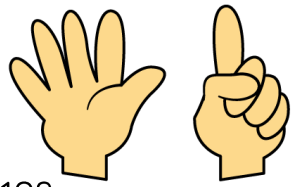
What would these bonds look like as a number sentence?

Can I order the number bonds systematically?

Do number bonds to 10 only contain one digit numbers?

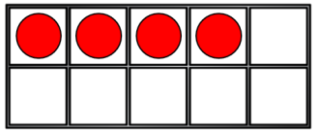
Varied Fluency

- Amir shows a number on his fingers.

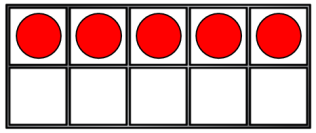


How many more fingers are needed to make 10?
What would this look like as a number sentence?

- Use the ten frames to complete the number bonds to 10



$4 + __ = 10$



$5 + __ = 10$

Can you make the ten frame that comes before in the sequence?
Can you make the ten frame that comes next in the sequence?

- All the ladybirds should have 10 spots. Some of the ladybirds have lost their spots. Complete the spots and write the number sentences.

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Number Bonds to 10

Reasoning and Problem Solving

Always, Sometimes, Never

Number bonds to 10 have two different numbers added together.

Sometimes, there is one case where it is two of the same number.
$5 + 5 = 10$

Dora has 10 p to spend.

5 p 6 p 4 p

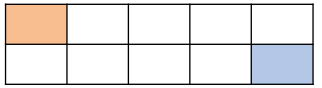
5 p 6 p 4 p

Which two items could she buy?
How many different ways can she do it?

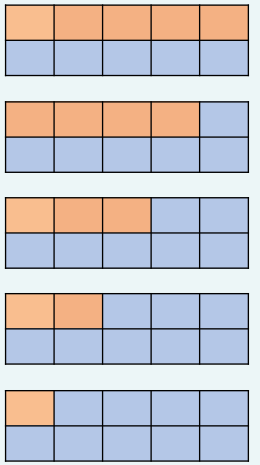
A chew bar and a muffin.
A banana and a chocolate bar.
A banana and a bottle of pop.
An apple and a chocolate bar.
An apple and a bottle of pop.

Tommy needs to colour in **all** of the boxes using two different colours.

One box of each colour has been done for him.



How many different ways can he colour the boxes?



This can also be the other way where there are 9 oranges and 1 blue, 8 oranges and 2 blues, 7 oranges and 3 blues, 6 oranges and 4 blues.

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Compare Number Bonds

Notes and Guidance

Children use their knowledge of place value and number bonds to compare numbers and number sentences. They should use the correct language and symbols to compare.

E.g. 5 + 5 = 10 and 10 is greater than 8, so 5 + 5 > 8

Using concrete manipulatives will support their emerging knowledge of number bonds and can be used to develop a deeper understanding by proving why they know one number is greater than another.

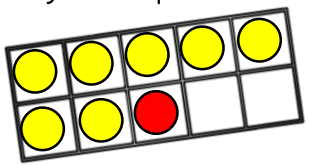
Mathematical Talk

What does compare mean?
Do we know what each side is worth?
How can we work out the total of each side?
Can you use equipment to prove that the number bonds are equal/unequal?
Do I have to solve both sides to see if the number bonds are equal?
Which calculation gives the largest answer?
Which calculation gives the smallest answer?
Which symbol can you use to show this?

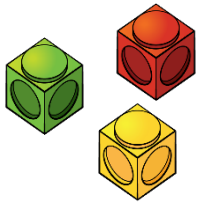
Varied Fluency

- Match the number bonds that are equal.
Can you use ten frames and counters to prove they are equal?

4 + 5	7 + 1
2 + 6	6 + 3
4 + 2	3 + 3



- Use cubes to help you fill in <, > or = to make the statements correct.



5 + 5 ◯ 10

5 + 5 ◯ 8

2 + 5 ◯ 5 + 3

- Complete the number sentences.

5 + 3 = 4 + ___

7 + 3 > ___ + 2

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Compare Number Bonds

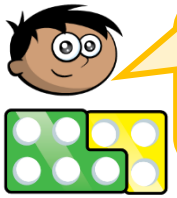
Reasoning and Problem Solving

How many different ways can you complete the number sentence?

$3 + __ < 3 + __$

Any combination where the number on the right is larger than the one on the left.

Amir and Whitney have both created their own number bonds.



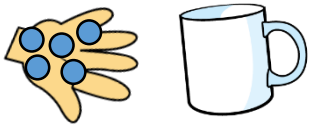
My total is greater because I have a 5 and a 3

My total is greater because I have 9 altogether.

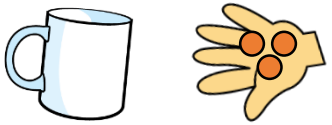
Who do you agree with?
Explain your answer.

Whitney is correct because 9 ones is greater than 3 ones and 5 ones (8 ones).

Teddy has 5 counters in his hand and some in a cup.



Tommy has 3 counters in his hand and some in a cup.



They each have the same number of counters in total.

They each have less than 10 counters.

How many counters could be in Teddy's cup?

How many counters could be in Tommy's cup?

Possible answers:
Teddy could have 1 and Tommy could have 3
Teddy could have 2 and Tommy could have 4
Teddy could have 3 and Tommy could have 5
Teddy could have 4 and Tommy could have 6

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Fact Families – 8 Facts

Notes and Guidance

Children will link addition and subtraction facts for the first time. It is important that children are able to show and understand this relationship. They should continue to be exposed to the use of zero.

Children can struggle with getting four calculations for subtraction e.g. $7 = 9 - 2$ and $2 = 9 - 7$ and should use concrete and pictorial representations to aid their understanding of this.

Mathematical Talk

How many counters were there at first? How many were taken away? How many are left? Can you draw an image to show this?

How many will you start with? Why?

How many will you take away? Why?

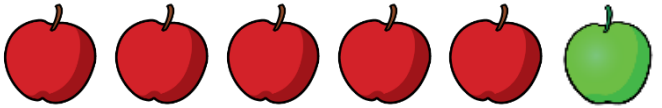
What is the same and what is different about the calculations?

Varied Fluency

Using the image, how many calculations can you create?

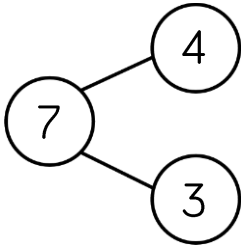
___ + ___ = ___	___ = ___ + ___
___ + ___ = ___	___ = ___ + ___
___ − ___ = ___	___ = ___ − ___
___ − ___ = ___	___ = ___ − ___

There are 6 apples. 5 of them are red and 1 is green.



Write 8 number sentences to show this.

Write 8 number sentences to match the part-whole model.



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Fact Families – 8 Facts

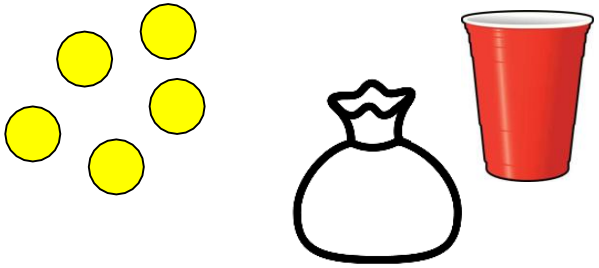
Reasoning and Problem Solving

Explain the mistakes that have been made.

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

The bottom two on the right should be:
$5 = 7 - 2$
and
$2 = 7 - 5$

Amir has 5 counters in total.
Each of his counters are either in a bag or a cup.
How many different ways could the counters be split between the bag and the cup?



Write 8 number sentences to go with each.

Are any of the sets of number sentences the same? Why?

There could be:
5 in the cup, 0 in the bag
4 in the cup, 1 in the bag etc.

Children should notice that number sentences are the same for "4 in the cup, 1 in the bag" and "1 in the cup, 4 in the bag" etc. because the parts are the same.

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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

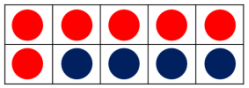
What strategy could you use to make sure you find all the number bonds?

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

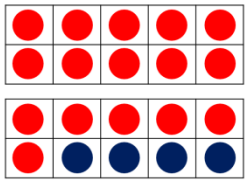
How does knowing your number bonds to 10 help you to work out your number bonds to 20?

Varied Fluency

What number bond is represented in the pictures?

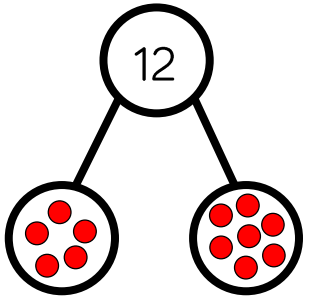


There are ___ red counters.
There are ___ blue counters.
Altogether there are ___ counters.
___ + ___ = ___ ___ + ___ = ___



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?

$$7 + 3 = 10$$

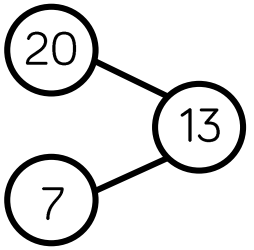
$$17 + 3 = 20$$

$$20 = 7 + 13$$

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.

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?

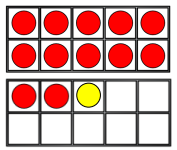
If we know 12 + 1 = 13, what else do we know?

Can you see any patterns?

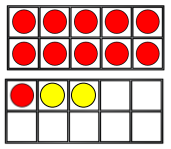
If we know that 15 – 3 = 12, why can't we say 3 – 15 = 12?

Varied Fluency

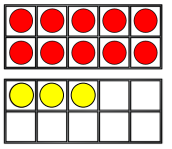
Complete the addition sentences.



12 + 1 = 13



11 + ___ = 13



___ + ___ = ___

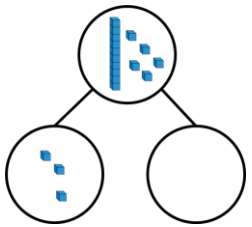
Can you write a subtraction sentence for each?

13 – 1 = 12

13 – ___ = ___

___ – ___ = ___

Complete:



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

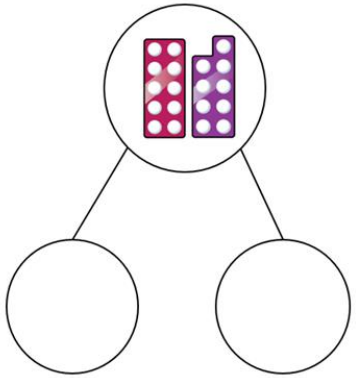
Complete and write addition and subtraction sentences for each bar model.

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.

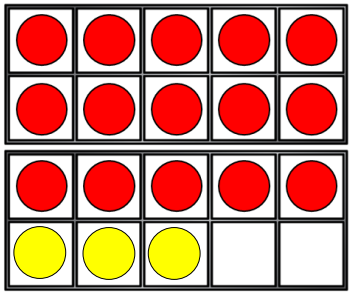


nine	add
ten	subtract
nineteen	is equal to

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.



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

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

Fact Families

Notes and Guidance

Children apply their understanding of known addition and subtraction facts within 20 to identify all related facts.
This will include an understanding of the relationship between addition and subtraction, and knowing the purpose of the equals sign, as well as the addition and subtraction signs.
Showing the link between representations, such as part-whole models and bar models can support and deepen the children's understanding.

Mathematical Talk

What if we took away the red flowers? What are the parts? What is the whole?

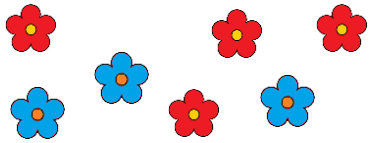
Does it change the answer if we add the blue and red flowers in a different order?

What does each circle represent on the part-whole model?

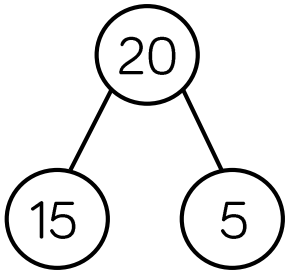
How many different number sentences are there in the fact family?

Varied Fluency

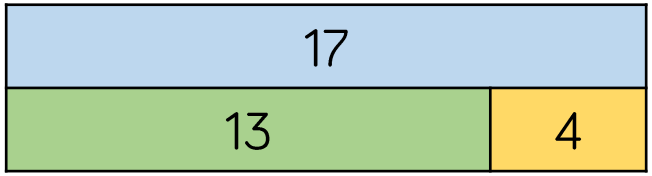
- Using concrete apparatus, can you talk about the relationships between the different flowers?



- One relationship shown by this part-whole model is 15 + 5 = 20
Can you write all associated number sentences in the fact family?



- Look at the bar model below.
Can you write all of the number sentences in the fact family?



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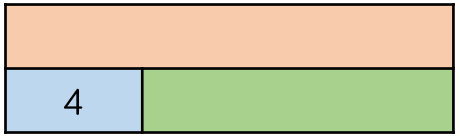
Fact Families

Reasoning and Problem Solving

Here is an incomplete bar model.
The total is greater than 10 but less than 20
What could the missing numbers be?
How many different combinations can you find?



7 and 11
8 and 12
9 and 13
10 and 14
11 and 15
12 and 16
13 and 17
14 and 18
15 and 19

Rosie says,

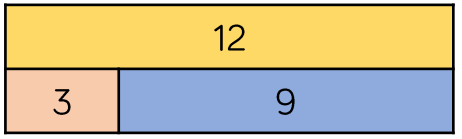
$8 - 5 = 3$
$8 - 3 = 5$
$8 = 5 - 3$
$3 = 8 - 5$

I think that all of these facts are correct because the numbers are related

Ron disagrees.
Who is correct? Can you prove it?

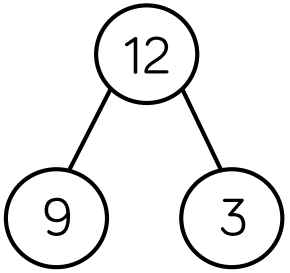
Ron is correct because 8 is not equal to 5 – 3

Which of the representations are equivalent to the bar model?



$12 = 9 + 3$

There are 9 cars in a car park, 3 cars leave.



$9 - 3 = 12$

The number line, the part-whole model and $12 = 9 + 3$

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Check Calculations

Notes and Guidance

It is essential that children have the opportunity to discuss and share strategies for checking addition and subtraction calculations.
Checking calculations is not restricted to using the inverse.
Teachers should discuss using concrete resources, number lines and estimating as part of a wide range of checking strategies.

Mathematical Talk

What resources could you use to check your calculation?

Can you check it in more than one way?

Why do we need to check our calculation?

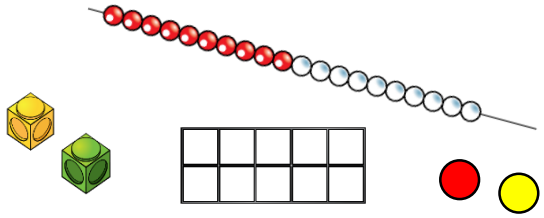
Is there another way you could represent this?

Varied Fluency

- Use concrete objects to check and prove whether the calculations are correct.

$12 - 4 = 8$

$7 + 8 = 15$



- Can you use inverse operations to check $5 + 12 = 17$?

How many possible inverse calculations are there?

- Eva writes this calculation: $18 - 5 = 13$
Which of the following could she use to check her work?

$13 + 5$	$13 - 5$
$18 - 13$	$5 + 13$

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Check Calculations

Reasoning and Problem Solving

Eva did the following calculation:

$$12 - 8 = 4$$

She checked it by using the inverse.

She did $12 + 8 = 20$ and said that her first calculation was wrong.

What advice would you give her?

It should have been $8 + 4 = 12$ or $4 + 8 = 12$

Teddy is checking Dora's work but doesn't do an inverse calculation.

These calculations can't be right.

$$24 + 6 = 84$$
$$25 - 23 = 12$$
$$18 - 3 = 21$$

How might he know?

What errors have been made in each calculation?

All of the calculations involve errors:

6 has been added to the tens instead of the ones.

25 and 23 are very close in value and therefore can't result in such a large difference.

18 and 3 have been added instead of subtracted.

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Bonds to 100 (Tens)

Notes and Guidance

Teachers should focus at this stage on multiples of 10 up to and within 100

Links should be made again between single digit bonds and tens bonds.

Using a 10 frame to represent 100 would be a useful resource to make this link.

Mathematical Talk

What does the word multiple mean?

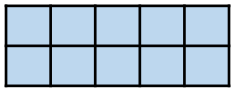
What does the blue represent? What does the yellow represent?

Why is it different to a normal 10 frame?

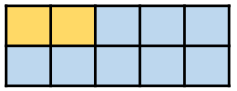
What patterns can you see? How does this help us to make up our own?

Varied Fluency

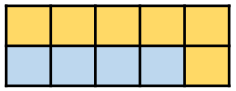
- Match the 10 frames to the sentences below:



One hundred equals eighty plus twenty



$100 = 100 + 0$



$40 + 60 = 100$

- Fill in the missing numbers. Use Base 10 to represent the numbers..

$2 + 6 = 8$

$20 + 60 = _____$

$2__ + __0 = 80$

$80 = __0 + 6__$

- Continue the pattern

$90 = 100 - 10$
$80 = 100 - 20$

Can you make up a similar pattern starting with the numbers 60, 30 and 90?

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Bonds to 100 (Tens)

Reasoning and Problem Solving

Eva thinks there are 10 different number bonds to 90 using multiples of 10
Amir thinks there are only 5

Who is correct?

Can you help the person who is wrong to understand their mistake?

Amir because
0 + 90 is the same as 90 + 0
Eva has repeated her answers – the multiples have been written the opposite way around.

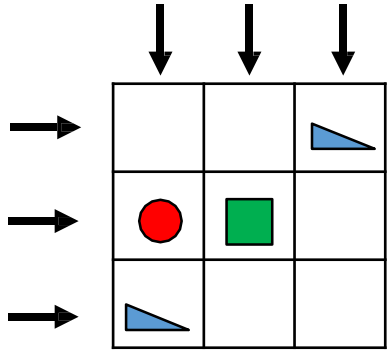
Using multiples of 10, how many number bonds are there for the following numbers?

20 30 40 50

What do you notice about the amount of bonds for each number?

If 80 has 5 bonds, predict how many 90 would have.

20 and 30 both have 2.
40 and 50 both have 3.
When the tens digit is odd it has the same number of bonds as the previous tens number. 90 would also have 5.

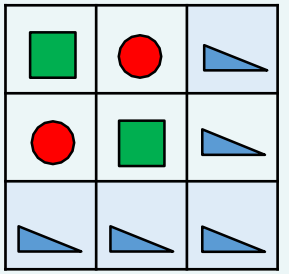


Squares are worth 10
Triangles are worth 20
Circles are worth 30

Can you complete the grid above so that all horizontal and vertical lines equal 60?

Can children create another pattern on an empty grid where each line equals 60?
How many possible ways are there to solve this?

Solution



Lots of possible solutions available.

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Bonds to 100 (Tens and Ones)

Notes and Guidance

Here children build on their earlier work on number bonds to 100 with tens together with number bonds to 10 and 20

They use their new knowledge of exchange to find number bonds to 100 with tens and ones.

Using hundred squares, Base 10, bead strings etc. will help the children develop their understanding.

Mathematical Talk

How many more do we need to make 100?

How many tens are in 100?

If I have 35, do I need 7 tens and 5 ones to make 100? Explain why.

Can you make the number using Base 10?

Can you add more Base 10 to the number to make 100?

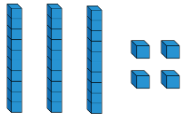
Varied Fluency

Use a 100 square. If:

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

- 40 squares are shaded, how many are not shaded?
- 45 squares are shaded, how many are not shaded?
- 54 squares are shaded, how many are not shaded?

Tommy is making 100 with Base 10
How much more does he need if he has:

- 
- 5 tens and 3 ones
- 37

Children could place their Base 10 on top of a 100 piece to help them calculate.

$25 + ___ = 100$

$100 - 84 = ___$

$___ + 69 = 100$

$100 - ___ = 11$

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Bonds to 100 (Tens and Ones)

Reasoning and Problem Solving

Teddy has completed the missing number sentence.

$$46 + 64 = 100$$

Is Teddy correct?
Explain your answer.

Teddy is incorrect. He has seen number bonds to 10 but forgotten that he would need to exchange ten ones for one ten.
$46 + 64 = 110$

Each row and column adds up to 100.

Complete the grid.

45	45	
	35	
15		65

45	45	10
40	35	25
15	20	65

Complete the pattern.

$$15 + 85 = 100$$
$$20 + 80 = 100$$
$$25 + 75 = 100$$
$$30 + __ = 100$$
$$__ + __ = 100$$

Can you explain the pattern?

$30 + 70 = 100$
$35 + 65 = 100$
The first numbers are going up in fives and the second numbers are going down in fives. All of the number sentences are number bonds to 100

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Make the Same Amount

Notes and Guidance

Children explore the different ways of making the same amount. As before, they will not count pence over into pounds.

Examples need to be modelled where pounds and pence are together but children need to continue to be encouraged to count the pounds and pence separately.

Mathematical Talk

Can the same amount be made using different coins?
How did you compare the amounts?
How is your way different to a partner?

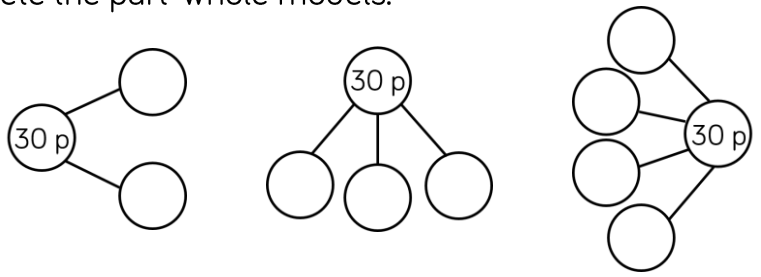
Can you swap a coin/note for others and still make the same amount?

What is the smallest amount of coins you can use to make ___?

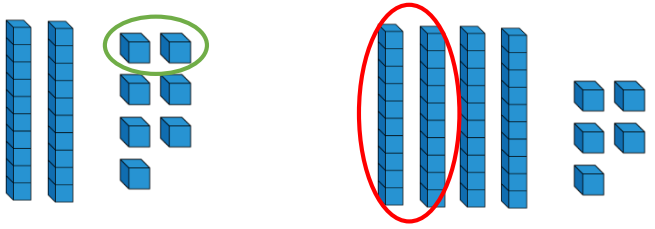
Varied Fluency

- Match the amounts.

- Complete the part-whole models.



- The Base 10 represents money. What coin is represented by each circle?



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Make the Same Amount

Reasoning and Problem Solving

Make 50 p three ways using the coins below.

You can use the coins more than once.

Example answers:

20 p, 20 p, 10 p

10 p, 10 p, 10 p, 10 p, 5 p, 5 p

1 p (50 times)

How many ways can you make 10 p using only copper coins?

Did you use a strategy?

Example answers:

2 p, 2 p, 2 p, 2 p, 2 p

2 p, 2 p, 2 p, 2 p, 1 p, 1 p

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Addition & Subtraction

Theme 5 – Addition-adding more

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Add More

Notes and Guidance

Children will move from counting all to counting on. It is important that they are exposed to calculations given to them in a different order, for example the smallest number first.

This will lead to children understanding that addition can be done in any order.

Continue to use concrete and pictorial representations to support the children's conceptual understanding.

Mathematical Talk

How many did you have to begin with?

How many more have been added?

How many do you have now?

What number sentence will represent this?

When using resources/images to find the answer, do I need to make/draw both numbers?

Do I have to start with the largest number?

Why is it more efficient to start with the larger number?

Varied Fluency

How many tractors are there in total?

6 + ___ = ___

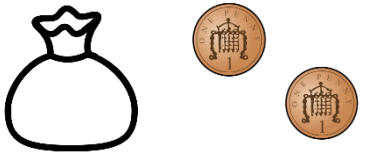
There are ___ tractors.

There are 3 aeroplanes at the airport.
5 more aeroplanes land.
How many aeroplanes are there now?

Now there are ___ aeroplanes altogether.

How could we represent this as a number sentence?

There are four pennies in a bag and I add two more.
How many pennies do I have now?



□ = □ + □

There are ___ pennies.

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Add More

Reasoning and Problem Solving

True or False?

If I add 0 to a number, the number stays the same.

Can you use a number line or counters to help you explain your answer?

True because when you add 0 you are not adding any more.

Mo has used the number track to complete 4 + 2
He thinks the total is 5

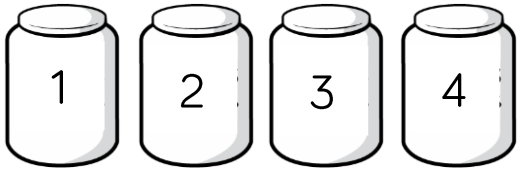
1	2	3	4	5	6	7	8

What mistake has he made?
How could Mo use the number track to find the correct answer?

He has included the starting number. To find the correct answer Mo could start counting from 5, or he could put the 4 on and then the 2 to show that the answer is 6

Sid has two bean bags.

He is throwing them into jars.
The number on the jar shows how many points he gets for a beanbag landing in that jar.
One of his beanbags lands in jar 2



What is the highest score he can get by throwing the second bean bag and adding the scores?

What is the lowest score he can get by throwing the second beanbag and adding the scores?

Explain why he can't get a total of 9

The highest score he can get is a 6 if his second beanbag landed in the 4 jar.
The lowest score he can get is a 2 if he misses the jars with his second beanbag.
He cannot get 9 because he got 2 with his first beanbag, so he would need 7 and there isn't a jar with 7 on.

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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

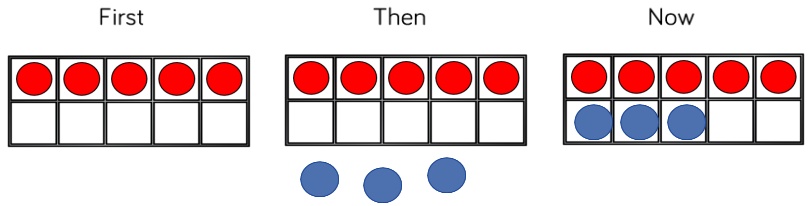
What number did you start with? Then what happened? Now what do I have?

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?

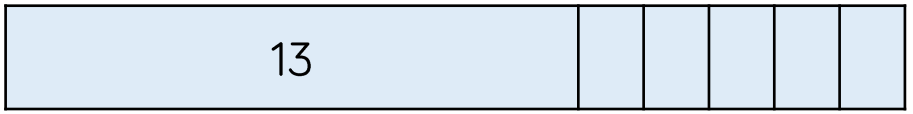
Varied Fluency

Use ten frames to complete the number story.

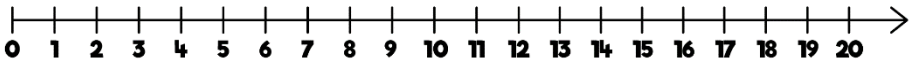


First there were ___ cars in the car park.
Then ___ more cars parked in the car park.
Now there are ___ cars in the car park.

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

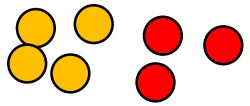
Reasoning and Problem Solving

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

$0 + 12 = ___$

$7 + 0 = ___$

$14 + ___ = 17$



First	Then	Now

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,

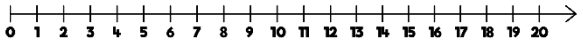
12, 13, 14, 15, 16, 17, 18

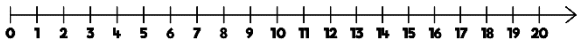
Use a number line to show who is correct.

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.

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

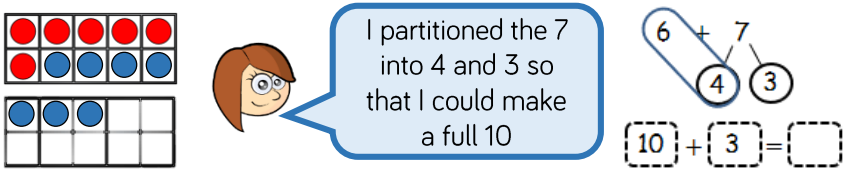
How can you partition a number and use your number bonds to 10 to help you?

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

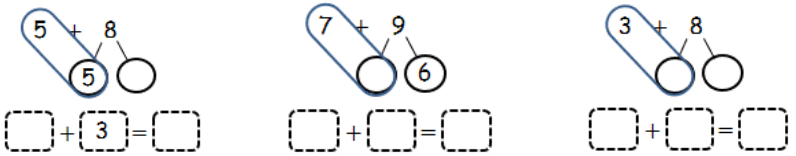
How does using a number line help you to see this strategy?

Varied Fluency

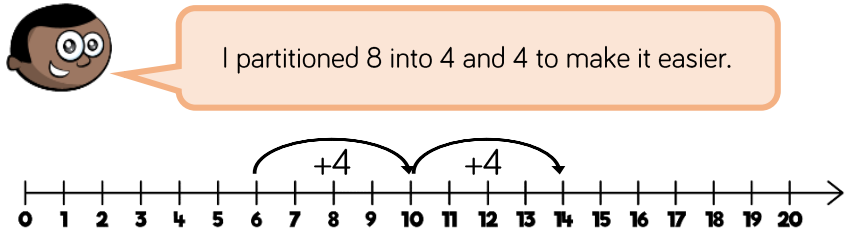
Rosie has used the 10 frames to calculate 6 + 7



Use Rosie's method to complete:



Mo has used a number line to calculate 6 + 8



Use Mo's method to calculate:

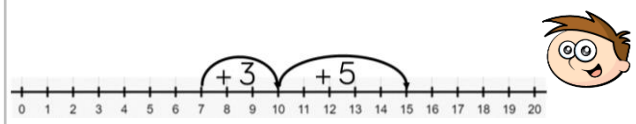
5 + 8 = ☐ 9 + 4 = ☐ 6 + 8 = ☐

Add by Making 10

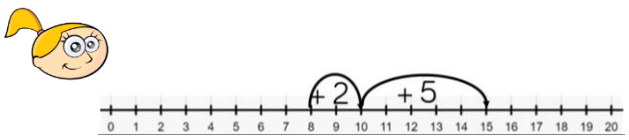
Reasoning and Problem Solving

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

Teddy shows it this way:



Eva shows it this way:



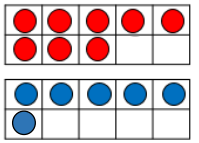
Who is correct?
Explain your answer.

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

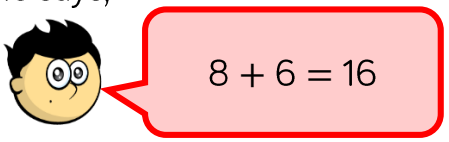
Teddy has started with 7 and partitioned the 8 into 3 and 5 to make 10

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.



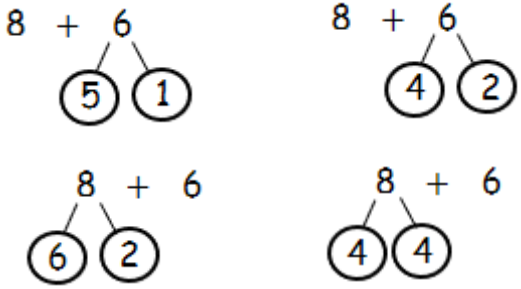
He says,



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

Add 2-digits and 1-digit

Notes and Guidance

Before crossing the 10 with addition, children need to have a strong understanding of place value. The idea that ten ones are the same as one ten is essential here. They need to be able to count to 20 and need to be able to partition two-digit numbers in order to add them. They need to understand the difference between one-digit and two-digit numbers and line them up in columns. In order to progress to using the number line more efficiently, children need to be secure in their number bonds.

Mathematical Talk

Using Base 10, can you partition your numbers?

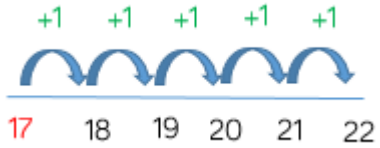
Can we exchange 10 ones for one ten?

How many ones do we have? How many tens do we have?

Can you draw the Base 10 and show the addition pictorially?

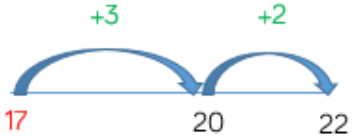
Varied Fluency

- 17 + 5 =

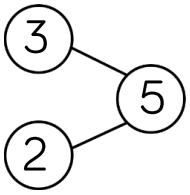


Can you put the larger number in your head and count on the smaller number? Start at 17 and count on 5

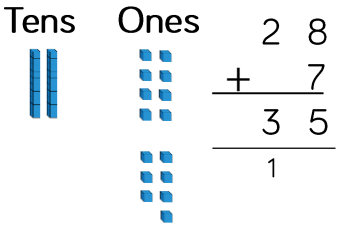
- Can we use number bonds to solve the addition more efficiently?



We can partition 5 into 3 and 2 and use this to bridge the 10



- Find the total of 28 and 7



$$\begin{array}{r} 2\ 8 \\ +\quad 7 \\ \hline 3\ 5 \\ \hline 1 \end{array}$$

- Partition both the numbers.
- Add together the ones.
- Have we got 10 ones?
- Exchange 10 ones for 1 ten.
- How many ones do we have?
- How many tens do we have?

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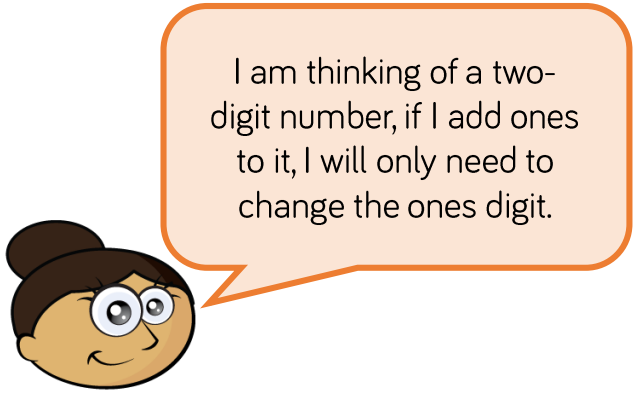
Add 2-digits and 1-digit

Reasoning and Problem Solving

Always, Sometimes, Never



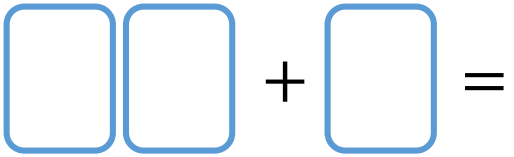
Explain your answer.

Sometimes, because if your ones total 10 or more you will have to exchange them which will change the tens digit.

Here are three digit cards.

Place the digit cards in the number sentence.

How many different totals can you find?



What is the smallest total?

What is the largest total?

67 + 8 = 75
68 + 7 = 75
76 + 8 = 84
78 + 6 = 84
86 + 7 = 93
87 + 6 = 93

75 is the smallest total.

93 is the largest total.

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Add 2-digit Numbers (1)

Notes and Guidance

This step is an important pre-requisite before children add two-digit numbers with an exchange.
Focus on the language of tens and ones and look at different methods to add the numbers including the column method.
It is important that teachers always show the children to start with the ones when adding using the column method.

Mathematical Talk

Can you partition the number into tens and ones?

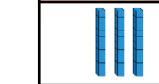
Can you count the ones? Can you count the tens?

Can you show your addition by drawing the Base 10 to help?

How could you represent the problem?

Varied Fluency

Find the sum of 34 and 23

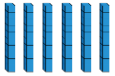
	Tens	Ones
+		

64 + 12 = _____

4 ones + 2 ones = _____

6 tens + 1 ten = _____

_____ tens + _____ ones = _____

	Tens	Ones
+		

Mo has 41 sweets. Whitney has 55 sweets.

How many sweets do they have altogether?

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Add 2-digit Numbers (1)

Reasoning and Problem Solving

Annie has 12 marbles.

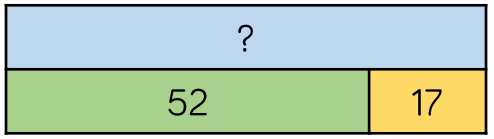
Ron has 13 marbles more than Annie.

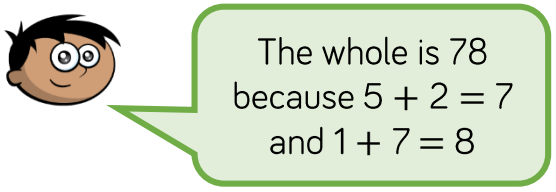
How many marbles do they have altogether?

Ron has 25 marbles.

Altogether they have 37 marbles.

Amir has been asked to complete the bar model.





Explain to Amir what he has done wrong. How could you help him work out the correct total?

Amir has found the digit totals and put the digits together to make 78

The correct answer is 69 and this could be shown by using Base 10 and a place value chart.

What digits could go in the boxes?

$\square 2 + \square 5 = 87$

Possible answers:
1 and 7
2 and 6
3 and 5
4 and 4
5 and 3
6 and 2
7 and 1

Interesting discussion could be had around is 1 and 7 different to 7 and 1?
Etc.

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Add 2-digit Numbers (2)

Notes and Guidance

Children use Base 10 and partitioning to add together 2-digit numbers including an exchange. They could be encouraged to draw the Base 10 alongside recording any formal column method.

They have already seen what happens when there are more than 10 ones and should be confident in exchanging 10 ones for one 10.

Mathematical Talk

Can you represent the ones and tens using Base 10?
What is the value of the digits?
How many ones do we have altogether?
How many tens do we have altogether?
Can we exchange ten ones for one ten?
What is the sum of the numbers?
What is the total?
How many have we got altogether?

Varied Fluency

64 + 17 = _____

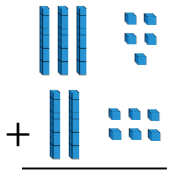
4 ones + 7 ones = _____

6 tens + 1 ten = _____

_____ tens + _____ ones = _____

$$\begin{array}{r} 64 \\ +\ 17 \\ \hline 11 \\ +\ 70 \\ \hline 81 \end{array}$$

Find the sum of 35 and 26



- Partition both the numbers.
- Add together the ones. Have we got 10 ones?
- Exchange 10 ones for 1 ten.
- How many ones do we have?
- Add together the tens. How many do we have altogether?

Class 3 has 37 pencils.
Class 4 has 43 pencils.

How many pencils do they have altogether?

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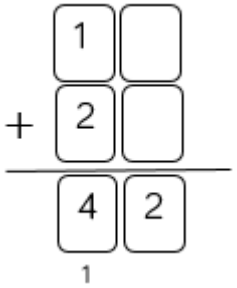
Add 2-digit Numbers (2)

Reasoning and Problem Solving

Can you create a calculation where there will be an exchange in the ones and your answer will have two ones and be less than 100?	There are lots of possible solutions. E.g. 33 + 29 = 62
How many different ways can you solve 19 + 11? Explain your method to a partner. Use concrete or pictorial resources to help explain your method.	Children might add the ones and then the tens. Children should notice that 1 and 9 are a number bond to 10 which makes the calculation easier to complete mentally.

Find all the possible pairs of numbers that can complete the addition.  How do you know you have found all the pairs? What is the same about all the pairs of numbers?	13 + 29 19 + 23 14 + 28 18 + 24 15 + 27 17 + 25 16 + 26 All the pairs of ones add up to 12

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Add Three 1-digit Numbers

Notes and Guidance

Children need to use their knowledge of commutativity to find the most efficient and quick way to add the three one-digit numbers.

They look for number bonds to 10 to help them add more efficiently.

Mathematical Talk

Can we change the order of the numbers to make the calculation easier?

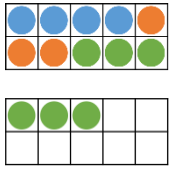
Why are we allowed to change the order of the numbers?

Which two numbers did you add first? Why?

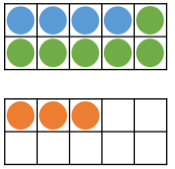
What if you added a different two numbers first, would your answer be the same?

Varied Fluency

Use ten frames and counters to add the numbers $4 + 3 + 6$



Can you add the numbers in a different way to find a number bond to 10?



$4 + 6 = 10$

$10 + 3 = 13$

Find the totals of each row and column.

5	4	2	
3	7	8	
5	7	3	

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

$5 + 4 + 6 \bigcirc 6 + 5 + 4$

$7 + 3 + 8 \bigcirc 7 + 7 + 3$

$9 + 2 + 5 \bigcirc 8 + 3 + 5$

$8 + 4 + 2 \bigcirc 2 + 5 + 8$

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Add Three 1-digit Numbers

Reasoning and Problem Solving

Always, Sometimes, Never

odd + odd + odd = odd

Use one-digit numbers to test if this is true e.g.

3 + 5 + 7

Always, children may recognise that two odds make an even so three odds make an odd.

Which numbers would you add together first in the following number sentences? Why would you add those first?

3 + 5 + 7 =

8 + 2 + 6 =

4 + 3 + 4 =

3 and 7 first – number bond to 10

8 and 2 first – number bond to 10

4 and 4 first – double a number.

Is there always an easier order to add three one-digit numbers?

No, e.g. 5 + 6 + 7

Take 3 consecutive one-digit numbers, e.g. 4, 5 and 6.

Add them together.

What do you notice?

Choose different groups of 3 consecutive one-digit numbers and see if there is a pattern.

1 + 2 + 3 = 6
2 + 3 + 4 = 9
3 + 4 + 5 = 12
4 + 5 + 6 = 15
5 + 6 + 7 = 18
6 + 7 + 8 = 21
7 + 8 + 9 = 24

If we order the groups, we can see that the totals go up by 3 each time. This is because we are adding one to each number each time so we are adding 3 extra altogether.

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Find the Total

Notes and Guidance

Children will build on their knowledge of addition to add money including:

- 2-digit and 2-digit
- 2-digit and ones
- 2-digit and tens
- 3-single digits

Children will be encouraged to use different methods to add the amounts of money, such as count on, partitioning and regrouping.

Mathematical Talk

How did you find the missing amounts? Share your strategies with a friend.
Was your method different to a friend?

What is the most efficient method? Why?

Can you write a worded question for a friend?

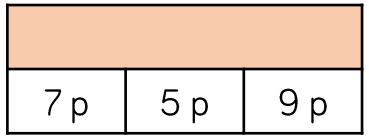
What was the greatest amount you found?

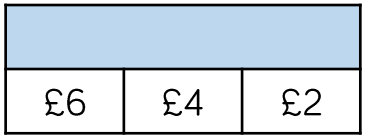
Varied Fluency

Complete the table.

Pounds	Pence	Total
£4	25 p	£____ and ____p
£2		£2 and 40 p
	65 p	£20 and 65 pence
		£15 and 20 p
	55 pence	

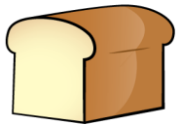
Complete the bar models.





Amir buys bread and eggs.

49 p


30 p

How much does he spend?

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Find the Total

Reasoning and Problem Solving

Dexter has these coins and notes.

He makes an amount greater than £20 but less than £30

Draw the money he could have used.
You can use each coin or note more than once.

How many different ways can you find?

Possible answers:

£10, £10 and £5 makes £25

£10, £5, £5, £2 makes £22

Etc.

Here is a shopping list.

Item	Price
Rubber	20 p
Ruler	18 p
Pencil	32 p
Crayon	27 p
Pen	45 p
Glue	36 p

- I spend exactly 50 p. Which two items did I buy?
- I bought two of the same item and it cost me 90 p. What was the item?
- Choose two items. How many different amounts can you make?
- What is the closest you can get to 65 p?

The ruler and the pencil as 18 p and 32 p makes 50 p.

Two pens as 45 p and 45 p makes 90 p.

Children to explore the totals that can be made by adding two items together.

The rubber and the pen would cost 65 p as 20 p and 45 p sum to 65 p.

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Addition & Subtraction

Theme 6 – Subtraction

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How Many Left? (1)

Notes and Guidance

Children are introduced to the language of subtraction rather than the subtraction symbol being explored straight away.

'Taking away' is used in a range of real life contexts such as flying away and eating.

The use of zero is important so children know that when nothing is taken away the whole remains the same.

First, then, now ... story representations can help the children understand the concept of 'how many left'.

Mathematical Talk

How many objects were there to start with?

Do we need to count all the _____ or can we count on?

What could the story be? How many did we start with?

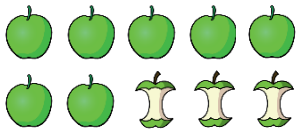
What number can we use to show that nothing has gone away/been taken away?

Varied Fluency

There were 7 birds in a tree and 3 flew away.
Complete the sentences.

At first there were ___ birds. Then ___ flew away. Now there are ___ birds in the tree.

Complete the sentences to create a story and draw a part-whole model.



At first there were ___ apples.
Then ___ were eaten.
Now there are ___ apples.

Write a story to go with the pictures and draw a part-whole model.

First:

Now:

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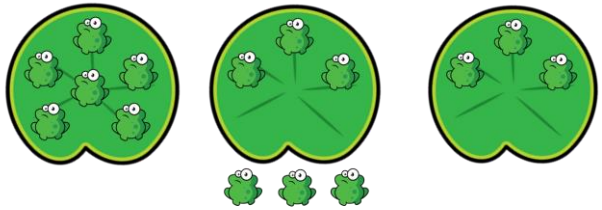
How Many Left? (1)

Reasoning and Problem Solving

Some frogs are on a lily pad.
Three frogs jumped off and there are three frogs remaining.



Complete the sentences.

First there were ___ frogs. Then ___ frogs jumped off. Now there are ___ frogs on the lily pad.

In the 'then' picture, do the 3s show the same thing? Why not?

What if 4 jumped off, how many frogs would there have been at first?

Explain how you know.

At first there were 6 frogs.
Then 3 frogs jumped off. Now there are 3 frogs on the lily pad.

No, the 3 on the lily pad show how many are left. The 3 that are not on the lily pad show how many went away.

If 4 jumped off, the whole would have been 7 because 3 and 4 make 7

Some cakes have been eaten.

There are 2 cakes left.

How many cakes could there have been, and how many could have been eaten to be left with 2?

Explain your reasons.

There could have been 10 and 8 were eaten, 9 and 7 were eaten, 8 and 6 were eaten etc.
Children might use cubes/ten frames etc. to help them take away and finish with 2

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How Many Left? (2)

Notes and Guidance

Once children understand the concept of taking away, the subtraction symbol can be introduced.

It is still important for children to create stories about the calculation and use concrete and pictorial representations so they can deepen their understanding of subtraction.

Mathematical Talk

How many counters were there at first? How many were taken away? How many are there now? Can you draw an image to show this?

What else could we use to represent the cars? How many will you start with? Why? How many will you take away? Why?

What is the same and what is different about the calculations?

Varied Fluency

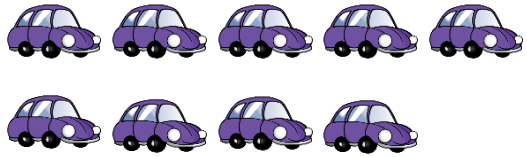
- Complete the number sentence.

7 – 2 = ___

Create a story to represent the calculation.

- Tom has 9 toy cars. He gives 5 of them away. How many does he have left?

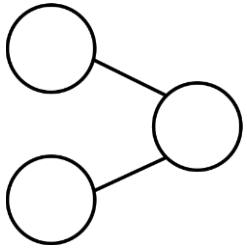
□ – □ = □



- At first there were 10 bananas. 7 of them were eaten. How many bananas are left?

Use counters/cubes to help you solve and complete:

□ – □ = □



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How Many Left? (2)

Reasoning and Problem Solving

How many ways can you get an answer of 0?

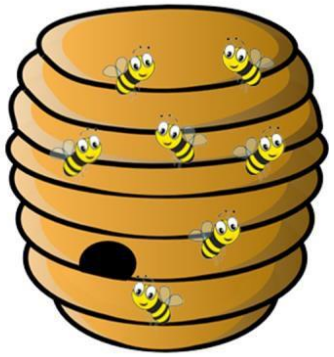
$\square - \square = 0$

What is the rule?

10 – 10, 9 – 9, 8 – 8 etc.

The rule is that to get zero, you have to take away the same number you started with.

How many calculations can you complete?



$\square = 7 - \square$

Why can't the digits 8 or 9 be used?

Children could write:
6 = 7 – 1
5 = 7 – 2 etc.

You can't use 8 or 9 because there are only 7 bees to begin with.

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Count Back

Notes and Guidance

Children count backwards to subtract. It is an important step to help children work in the abstract.

Common misconceptions could be that the children include their starting number when counting, e.g. 5 – 3; 5, 4, 3 – therefore giving the wrong answer.

It is vital to model how to count backwards by 'putting the start number in our head and counting backwards'.

Mathematical Talk

What number should we start on?

What number comes before 6?

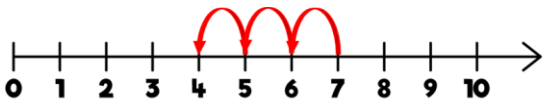
What could we say out loud to help?

Which calculations do you know match straight away?

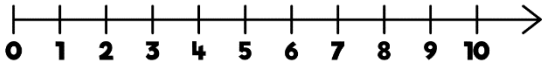
How do you know this?

Varied Fluency

Complete:

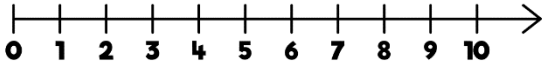


7 – 3 = ___



4 – 4 = ___

Use the number line to count back and match the calculations with the same answers.



7 – 3 = ___	6 – 6 = ___	10 – 6 = ___
5 – 0 = ___	9 – 4 = ___	4 – 4 = ___

Can you think of any other number sentences which could match them?

I count backwards from 9
How many steps does it take to get to two?
Show this in a number sentence.

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Count Back

Reasoning and Problem Solving

Eva is calculating 7 – 2 and does this by counting backwards on a number line.

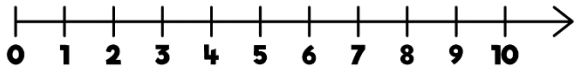
She gets an answer of 6

What mistake has she made?
What should the answer be?

Eva has included the starting number of 7 when she has been counting backwards.
The answer is 5

The answer is 2

How many ways can you get to this by counting backwards on this number line?



10 – 8,
9 – 7,
8 – 6 etc.

Game

Race to zero!

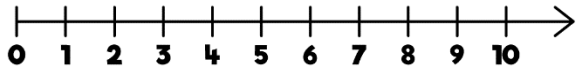
Start at 10 on a number line.

Roll a dice and subtract this amount.

The first person to land on 0 wins.

What would you like to roll? Why?

Why would you not want to roll a 1?



You might like to roll a 6 because it is a large amount to take away and so you would end up nearer to 0
You might not want to roll a 1 because it's a small amount and so it would take longer to get to 0

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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

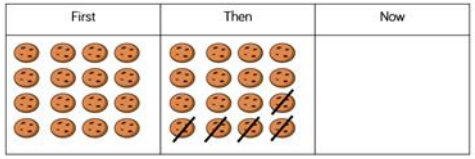
How many objects were there at first? Then what happened to the objects? How many objects are there now?

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?

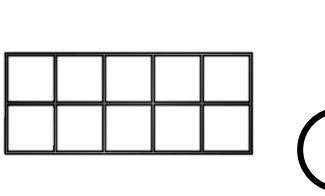
If Mo ate all of the biscuits, what number would we be left with? How do we write this as a calculation? What does the zero represent in this calculation?

Varied Fluency

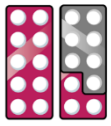
There are 16 biscuits on a plate. Mo eats 5 of them.
Complete the sentences.
First there were ___ biscuits.
Then ___ were eaten.
Now there are ___ biscuits.
16 – 5 = ___



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 = ___

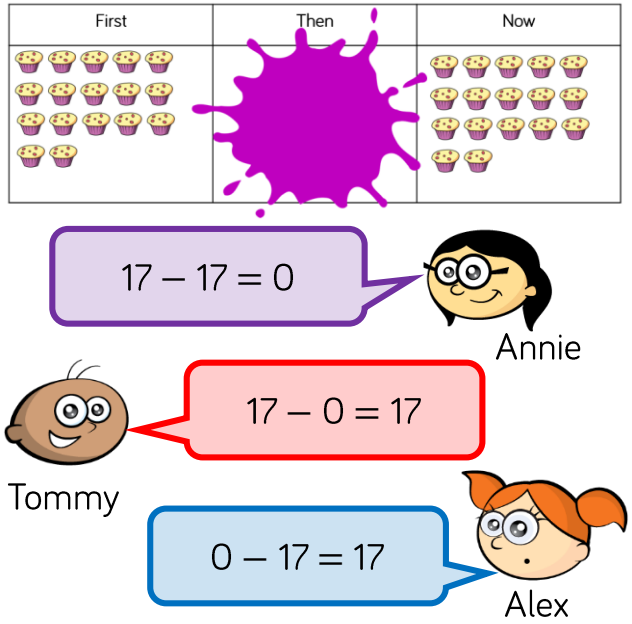
Use this method to calculate:

20 – 8
18 – 6
19 – 4

Subtraction – Not Crossing 10

Reasoning and Problem Solving

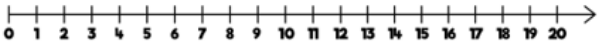
Annie, Tommy and Alex are working out which calculation is represented below.



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.



□ – □ = 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?

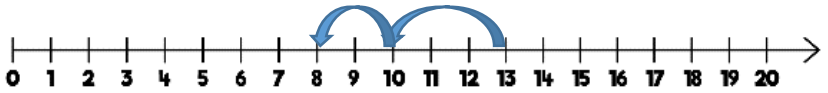
Can you think of another way to represent this problem?

Varied Fluency

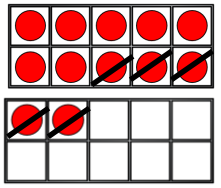
First there were 13 jam tarts

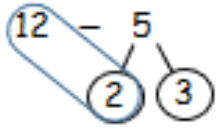
Then 5 were eaten

Now there are 8 jam tarts.



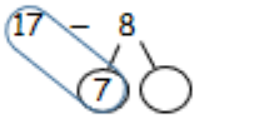
Rosie has used the ten frames to calculate 12 – 5



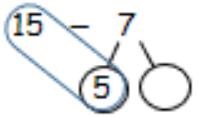


10 – 3 = 7

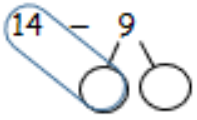
Use her method to complete:



10 – ☐ = ☐



☐ – ☐ = ☐



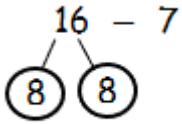
☐ – ☐ = ☐

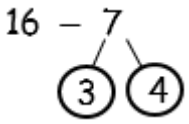
Subtraction – Crossing 10 (1)

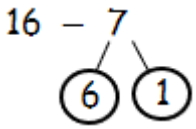
Reasoning and Problem Solving

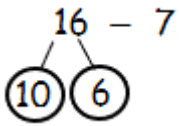
Rosie is calculating 16 – 7

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

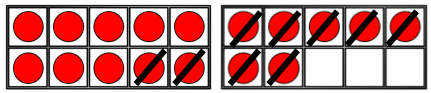
How do the counters and bar models help you to subtract?

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

Did you count forwards or backwards? Why?

Varied Fluency

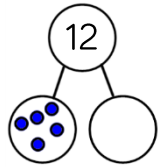
Complete the number sentences to describe what happens to the sweets.



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

□ – □ = □

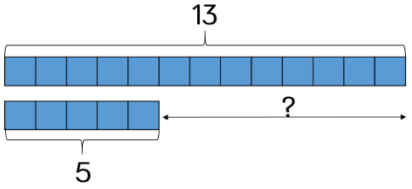
There are 12 cars in the car park.
5 of them are blue.
How many are red?



□ – □ = □

___ 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)

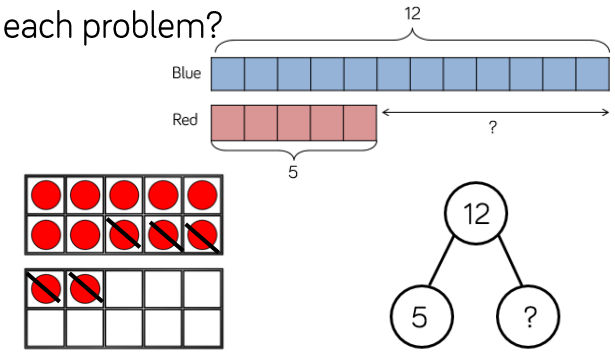
Reasoning and Problem Solving

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?

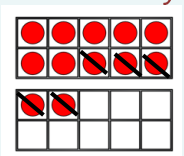
Which method would you use to solve each problem?



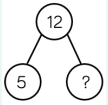
Ask the children to justify which method they would use and why.

Possible answers:

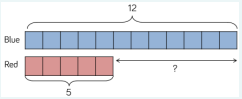
A Take away



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?)

Subtract 1-digit from 2-digits

Notes and Guidance

Just as with addition, children need to have a strong understanding of place value for subtraction. Children need to be able to count to 20 and need to be able to partition two-digit numbers in order to subtract from them. They need to understand the difference between one-digit and two-digit numbers and line them up in columns.
In order to progress to using the number line more efficiently, children need to be secure in their number bonds.

Mathematical Talk

Are we counting backwards or forwards on the number line?

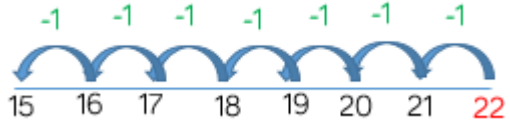
Have we got enough ones to subtract?

Can we exchange a ten for ten ones?

How can we show the takeaway? Can we cross out the cubes?

Varied Fluency

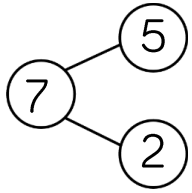
- $22 - 7 =$



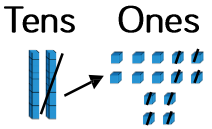
Can you put the larger number in your head and count back the smaller number? Start at 22 and count back 7

- Can we use number bonds to subtract more efficiently?

We can partition 7 into 5 and 2 and use this to bridge the 10



- Subtract 8 from 24



$$\begin{array}{r} {}^{1}\not{2}\,{}^{1}4 \\ -\quad 8 \\ \hline 1\ 6 \end{array}$$

- Do we have enough ones to take 8 ones away?
- Exchange one ten for ten ones.
- Take away 8 ones.
- Can you write this using the column method?

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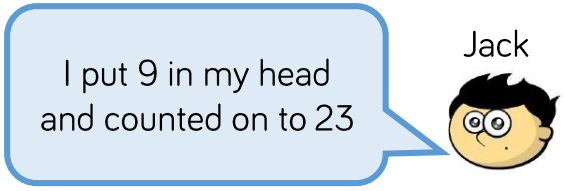
Subtract 1-digit from 2-digits

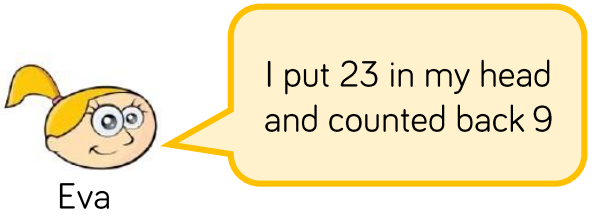
Reasoning and Problem Solving

Jack and Eva are solving the subtraction 23 – 9

Here are their methods:

Jack





Eva

Who's method is the most efficient?

Can you explain why?

Can you think of another method to solve the subtraction.

Eva's method is most efficient because there are less steps to take. The numbers are quite far apart so Jack's method of finding the difference takes a long time and has more room for error.

Mo is counting back to solve 35 – 7

He counts

35, 34, 33, 32, 31, 30, 29

Is Mo correct?

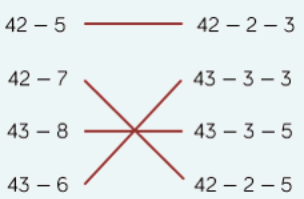
Explain your answer.

Mo is not correct as he has included 35 when counting back.

This is a common mistake and can be modelled on a number line.

Match the number sentences to the number bonds that make the method more efficient.

42 – 5	42 – 2 – 3
42 – 7	43 – 3 – 3
43 – 8	43 – 3 – 5
43 – 6	42 – 2 – 5



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Subtract with 2-digits (1)

Notes and Guidance

This step is an important step before children start to look at subtraction where they cross a tens boundary. Children need to use concrete materials but also draw images of the Base 10 so they can independently solve problems. Some children might think that they need to 'build' both numbers in the calculation, unpicking this misconception through modelling and discussion will help develop their understanding.

Mathematical Talk

Do we need to make both numbers in the subtraction before we take away?

Which number do we need to make? The larger number or the smaller?

What are the numbers worth? Tens or ones?

What happens if we have nothing left in a column? Which number do we write?

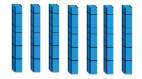
Varied Fluency

- 78 minus 34 = _____

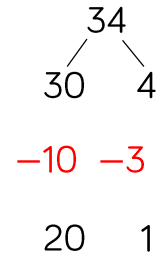
  8 ones – 4 ones = _____

  7 tens – 3 tens = _____

  We have _____ tens and _____ ones.

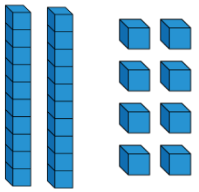
Tens	Ones
	

- 34 – 13 = _____



- Partition the number 34.
- Partition 13 and subtract the ones and the tens.
- Place the partitioned number back together.

- Subtract 13 from 28



$$\begin{array}{r} 2\ 8 \\ -\ 1\ 3 \\ \hline 1\ 5 \end{array}$$

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Subtract with 2-digits (1)

Reasoning and Problem Solving

Annie has 33 stickers.

Dexter has 54 stickers.

How many more stickers does Dexter have?

What method did you use to solve the problem?

Here the children are working out the difference.

Children might use subtraction to solve the problem or they might count on to find the difference.

Dexter has 21 more stickers than Annie.

Find the missing numbers.

$$\begin{array}{r} 6\,\square \\ -\ 2\,\square \\ \hline 4\ 2 \end{array}$$

Is this the only possible solution? Explain your answer.

Make the numbers using Base 10 to help you find your answer.

9 and 7

8 and 6

7 and 5

6 and 4

5 and 3

4 and 2

3 and 1

2 and 0

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Subtract with 2-digits (2)

Notes and Guidance

Children use their knowledge that one ten is the same as ten ones to exchange when crossing a ten in subtraction.

Continue to use concrete manipulatives (such as Base 10) and pictorial representations (such as number lines and part-whole models) to develop the children's understanding.

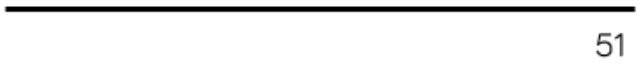
The skill of flexible partitioning is useful here when the children are calculating with exchanges.

Mathematical Talk

Have we got enough ones to take away?
Can we exchange one ten for ten ones?
How many have we got left?
What is the difference between the numbers?
Do we always need to subtract the ones first? Why do we always subtract the ones first?
Which method is the most efficient to find the difference, subtraction or counting on?

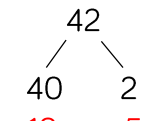
Varied Fluency

- Use the number line to subtract 12 from 51

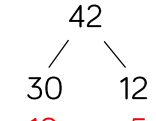


Can you subtract the ones first and then the tens?
Can you partition the ones to count back to the next ten and then subtract the tens?

- 42 – 15 =

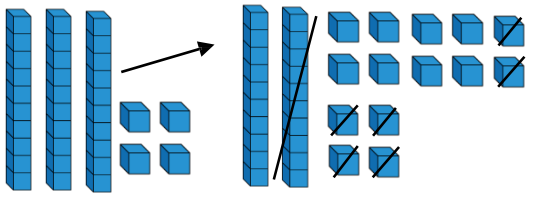


We can't subtract the ones. Can we partition differently?



Now we can subtract the ones and then subtract the tens.
42 – 15 = 27

- Take 16 away from 34



$$\begin{array}{r} {}^{2}\not{3}\,{}^{1}4 \\ -\ 1\ 6 \\ \hline 1\ 8 \end{array}$$

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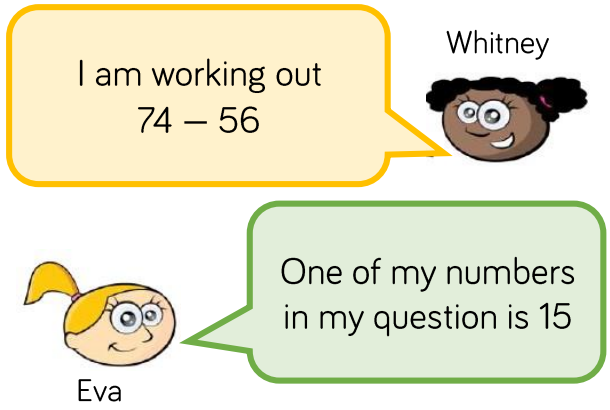
Subtract with 2-digits (2)

Reasoning and Problem Solving

Eva and Whitney are working out some subtractions.



Whitney's answer is double Eva's answer.

What could Eva's subtraction be?

Whitney's answer is 18

Eva's answer is 9

Eva's question could be 15 – 6 or 24 – 15

Find the greatest whole number that can complete each number sentence below.

$45 - 17 > 14 + ___$

13

$26 + 15 < 60 - ___$

18

Explain your answer.

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Find Change

Notes and Guidance

Children build on their subtraction skills by finding change from a given amount. They need to identify amounts from the coins given, write the calculations and choose efficient methods.

In this step, children will be introduced to converting £1 to 100 p to be able to subtract from £1. This links to their number bond knowledge to 100.

Mathematical Talk

How much does Dora have? How do you know?
Can you write a calculation to work out how much she will have left?

Why is it important to use the £ or p symbol?

What strategy did you use to find the change?
Did you use concrete objects to help?

Varied Fluency

- Dora has these coins.

She spends 53 p.
What money will she have left? What coins could it be?

- Write the calculation and find the amount of change.

32 p

___ – ___ = ___

- Ron spends 65 p in the shop.
He pays with a £1 coin.

How much change will he receive?

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Find Change

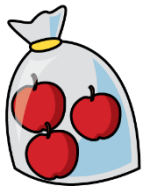
Reasoning and Problem Solving

I have 20 p.

My change is more than 5 p but less than 10 p.

What could I have bought?

Sweet: 7 p



Apples: 18 p

Chocolate: 12 p

Banana: 4 p

Example answers:

Chocolate bar or a sweet and banana.

I paid for my shopping with one coin.

Here is my change.

What could I have paid with and how much would the item have been?

Could have paid with a 20 p coin and it would have cost 3 p.

Could have paid with a 50 p coin and it would have cost 33 p.

Could have paid with a £1 coin and it would have cost 83 p.

Could have paid with a £2 coin and it would have cost £1 and 83 p.

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Addition & Subtraction

Theme 7 – Difference

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Find the Difference

Notes and Guidance

Children explore finding the difference as a form of subtraction. They often struggle with this concept because both parts are given.

Children could use their skills of counting back and counting on to help them find the difference. Alternatively, they can make both amounts and visually see how many more/less a number is.

Mathematical Talk

Who has more? How do you know? How many more does Whitney have?

What does difference mean? Which is most? How do you know? What strategy can we use to help us find the difference?

What image/resource can we use to show this?

How can we complete the sentences?

Varied Fluency

How many more cakes does Whitney have than Teddy?

Whitney

Teddy

Whitney has ___ more cakes than Teddy.

What's the difference between 10 and 6?

The difference between 10 and 6 is ___

10 – 6 = ___

Eva has 7 sweets and Mo has 3 sweets.
How many more sweets does Eva have?
How can you show this using cubes, counters or as an image?

Eva has ___ more sweets than Mo.

The difference between 7 and 3 is ___

7 – 3 = ___

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Find the Difference

Reasoning and Problem Solving

Two numbers have a difference of 4

The larger number is less than 10

What could the two numbers be?

9 and 5
8 and 4
7 and 3
6 and 2
5 and 1
4 and 0

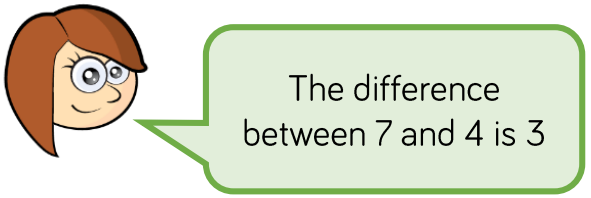
Annie says,

Write a number sentence to show why Annie is correct.

$10 - 3 = 7$
or
$7 = 10 - 3$

True or False?

Rosie says,



Can you show this in more than one way?

Children could show this by representing both numbers using cubes, bead strings, straws etc. or relating it back to counting backwards on a number line.

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Find the Difference

Notes and Guidance

Children expand their knowledge of addition and subtraction strategies by specifically finding the difference between two amounts.

In this step, children should see both counting on and counting back being modelled to them.
They need to discuss which is the most efficient for different questions.

Mathematical Talk

Which costs more? How do you know?
How can you work out how much more?

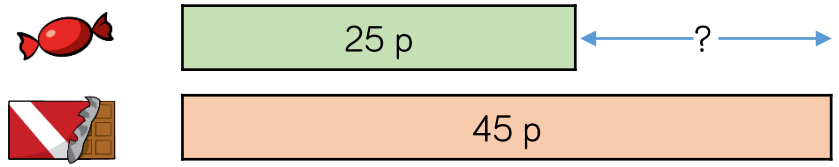
What's the difference?

How much less?/How many fewer?

What method did you use to work this out?

Varied Fluency

- Work out the difference between the cost of a bag of sweets and a bar of chocolate.



- Find the difference between the amounts of money Amir and Mo have.

Amir Mo

- Alex has £2 and 15 p.
  Rosie has £2 and 40 p.

  How much more money does Rosie have than Alex?

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Find the Difference

Reasoning and Problem Solving

I have 57 p.

Whitney

I have 2 silver coins and 1 bronze coin.

Mo

What could Mo have?

Work out the difference between the amounts.

How many different answers can you find?

Example answers:

Mo could have more by:

- 50 p, 2 0p, 1 p
- 50 p, 20 p, 2 p

Mo could have the same by:

- 50 p, 5 p, 2 p

Mo could have less by:

- 5 p, 5 p, 1 p
- 20 p, 10 p, 2 p

Jack has 2 p.

Eva has 10 p.

Both of them have a 2 p coin.

What **other** coins could Eva have?

4 × 2 p

3 × 2 p and 2 × 1 p

2 × 2 p and 4 × 1 p

1 × 2 p and 6 × 1 p

8 × 1 p

5 p and 2 p and 1 p

5 p and 3 × 1 p

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Addition & Subtraction

Theme 8 – Compare number sentences

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Compare Statements (1)

Notes and Guidance

Children use the inequality symbols to compare statements.
It is important that 'equal to' is also recapped at this stage with the correct language used.

Children should use concrete manipulatives and draw images to help them complete the statements.

Mathematical Talk

What does greater than mean?
How do we know that ___ + ___ is greater than ___?
What else can it be greater than?
What does less than mean?
How do we know that ___ + ___ is less than ___?
What else can it be less than?
What language is missing?
What steps do we need to take to help us complete the problem?

Varied Fluency

Complete the sentences.

3 + 1 is greater than ___
3 + 1 is greater than ___
3 + 1 is less than ___
3 + 1 is less than ___

One bird lays 3 eggs. Another bird lays 2 eggs.

Complete the sentence using greater than, less than or equal to.

2 plus 3 is _____ 6

Complete the number sentences.

___ + ___ is equal to 7

___ + 4 is less than 9

5 + ___ is _____ 2

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Compare Statements (1)

Reasoning and Problem Solving

Would you rather have 6 sweets and 2 more sweets, or 8 sweets?

Explain your answer.
Use cubes or draw an image to help you.

I don't mind because I know that 6 and 2 is equal to 8

Using the numbers 0 – 10, how many different ways can you complete the boxes?

$\square + 7 = \square$

$\square + \square > 4$

$\square + \square < 9$

Possible answers:

$3 + 7 = 10$

$1 + 4 > 4$

$1 + 1 < 9$

What signs are missing?

$7 + 3 \bigcirc 10$

$9 \bigcirc 3 + 7$

$9 > 10 \bigcirc 3$

Explain how you know.

$7 + 3 = 10$ because I know that 7 and 3 is equal to 10

$9 < 3 + 7$ because I know that 9 is less than 10

$9 > 10 - 3$ because I know that 9 is greater than 7

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Compare Statements (2)

Notes and Guidance

Once children are able to compare a simple statement to an integer (whole number), they should begin to directly compare two calculations.

They should be exposed to both addition and subtraction calculations, and the symbols <, > and =

It is important that children know what the 'equal to' sign means,
and that we can use it to show that two calculations are equal.

Mathematical Talk

What's the same? What's different?

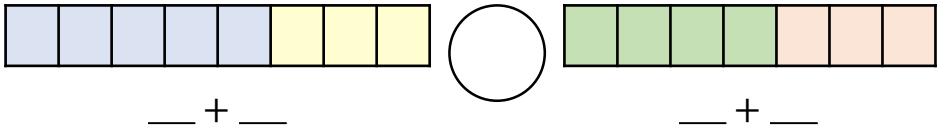
Do we always need to solve each calculation before we compare?

Which symbol should be used?

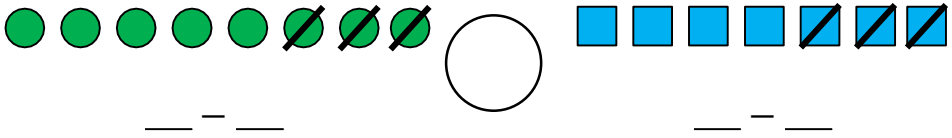
How can we prove that they are equal?

Varied Fluency

Complete using <, > or =



__ + __ ○ __ + __



__ – __ ○ __ – __

Dora has 8 sweets and eats 4 of them.
Mo has 7 sweets and eats some of them.
They now have the same number of sweets.
Can you draw a picture to represent this?
Use your picture to help you complete the number sentences.

8 – 4 ○ 7 – __

8 – 4 is equal to 7 – __

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Compare Statements (2)

Reasoning and Problem Solving

Tommy says,

5 + 2 is greater than 4 + 4 because 5 is greater than 4

Is he correct? Explain why.

No because

5 + 2 = 7

4 + 4 = 8

and

7 < 8

Use the digit cards to complete the sentences.

2	3	4	5

__ + __ = __ + __

__ − __ = __ − __

__ − __ > __ − __

__ − __ > __ + __

Can you write any more number sentences using these cards?

Possible answers:

5 + 2 = 4 + 3

5 − 4 = 3 − 2

5 − 2 > 4 − 3

5 − 2 < 4 + 3

Etc.

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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

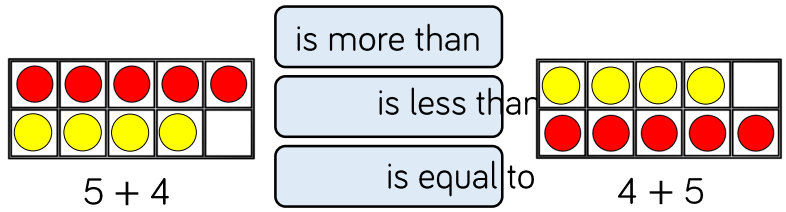
What do each of the symbols mean?

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?



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 <

Compare Number Sentences

Notes and Guidance

Children should be encouraged to examine number sentences to find missing values using structure rather than calculation.
Using numbers within 20 to explore mathematical relationships will give the children confidence and allow them to spot patterns because they are working within the context of familiar numbers.
Children should compare similar calculations using greater than, less than and equal to symbols.

Mathematical Talk

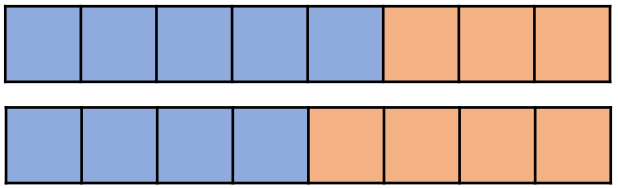
What other numbers make the same total?

Do we need to calculate the answer to work out the missing symbol?

Do you notice a pattern? What would come next?

Varied Fluency

- How can we use the following representation to prove that $5 + 3 = 4 + 4$?



- Fill in the circles with either $<$, $>$ or $=$

$6 + 4$ ◯ $6 + 5$

$6 + 4$ ◯ $3 + 6$

$11 - 4$ ◯ $12 - 5$

$11 - 4$ ◯ $12 - 4$

- Complete the missing numbers.

$5 + 3 = 6 + _____$

$5 + 3 = _____ + 6 = 7 + _____$

$_____ + 3 = _____ + 4 = 5 + 5$

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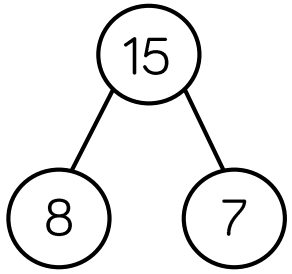
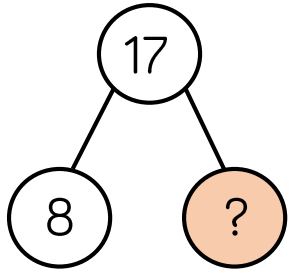
Compare Number Sentences

Reasoning and Problem Solving

Rosie thinks she knows the missing number without calculating the answer.





Can you explain how this could be possible?

17 is two more than 15, so the missing number must be two more than 7

The missing number must be 9

Both missing numbers are less than 10

$$7 + \square < 7 + \square$$

How many different possible answers can you find?

Lots of different combinations, the left number has to be smaller than the right.

Possible answers:
1 and 2
1 and 3
1 and 4
1 and 5
1 and 6
1 and 7
1 and 8
1 and 9
2 and 3
Etc.

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Compare Money

Notes and Guidance

Children compare two different values in either pounds or pence.
Children will see examples with both pounds and pence, but they will only focus on one of these - the other must be the same e.g. £3 and 10 p > £2 and 10 p where 10 p is the constant.
Children recap comparing vocabulary such as greater/less than and use the inequality symbols.

Mathematical Talk

What do you notice about the amounts you have compared?

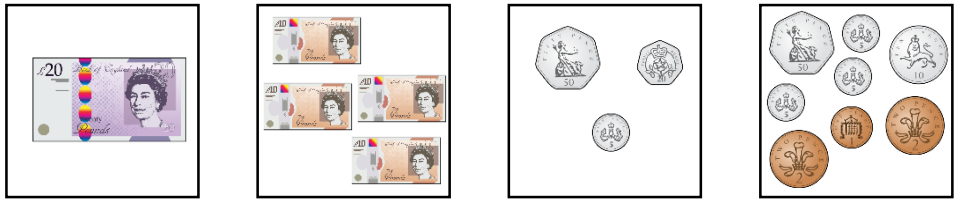
What's the same? What's different?

How do you know who has the most, when they both have 64?

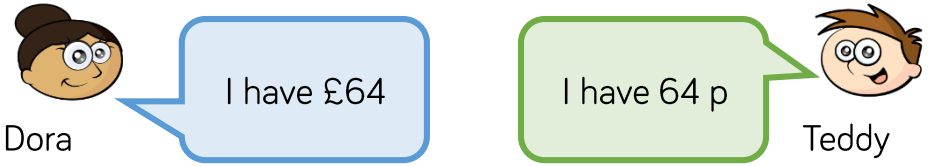
Can you add a value that will go in between the greatest and the least?

Varied Fluency

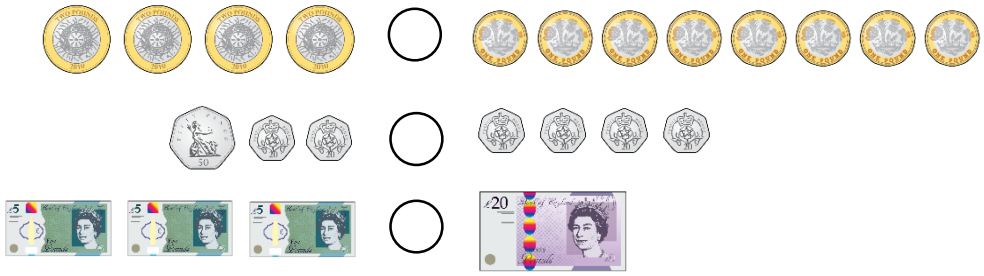
Circle the box with the greatest amount.



Who has the most? Who has the least? How do you know?



Use <, > or = to compare the amounts.



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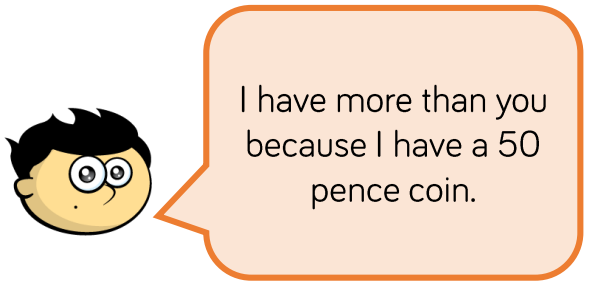
Compare Money

Reasoning and Problem Solving

Annie has three coins in her hand.

Jack says,



Is he correct?

Explain why.

It depends on the coins Annie has.

Children explore and show e.g.

20 p, 20 p, 20 p > 50 p

5 p, 2 p, 2 p < 50 p

True or False?

5 copper coins can be worth more than 1 silver coin.

Only true when 5 p is the silver coin.

Children should explore different true and false answers.

Four 5 pence coins are worth more than two 10 pence coins.

Do you agree? Explain why.

No, they are equal to each other. They both make 20 p.

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Addition & Subtraction

Theme 9 – Problem solving

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Two-step Problems

Notes and Guidance

Children draw together all of the skills they have used in this block and consolidate their previous addition and subtraction learning.
Children may need some scaffolding to see the different steps.
Bar modelling is really useful to see the parts and wholes, and supports children in choosing the correct calculation.

Mathematical Talk

Where does the £33 go in the bar model?
How can you find the total?

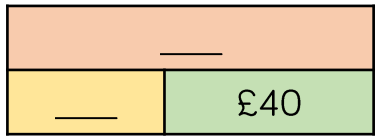
Here is a one step problem. Can you think of a second step?

Can you write your own two step word problem?

Did you use a concrete or pictorial representation to help you?

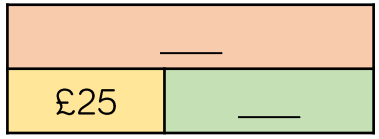
Varied Fluency

Rosie has £33 in her money bank, and gets £40 more.
Fill in the bar model and write a calculation to show her total.



___ + ___ = ___

She then buys a top for £25. Complete the bar model and write a calculation to show what she has left.



___ – ___ = ___

Amir has these coins.

He spends 54 p. How much does he have left?

A scarf is £12 and a bag is £25
Whitney buys one of each and pays with a £50 note.
How much change will she receive?

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Two-step Problems

Reasoning and Problem Solving

Ghost Train: 90 p

Annie finds a 20 p coin.

She puts it with her other three 20p coins.

Does Annie have enough to ride the ghost train?

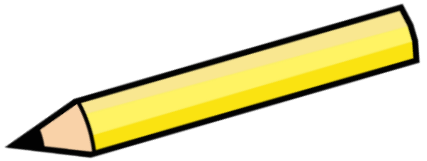
Explain why.

No, because she only has 80 p.

She would need 10 p more.

90 p > 80 p

Alex has 90 pence.
She bought a rubber for 30 pence and wants to buy a pencil.



Pencil: 70 p

The shopkeeper will not sell her the pencil.
Explain why.

90 p – 30 p = 60 p

70 p > 60 p

She does not have enough money to buy the pencil.

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